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Battelle Technical Review

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Air Pollution, Each Plant's Problem

THEORETICAL CHEMIST

JAMES J. WARD

The possible combinations of materials and conditions for solving a research problem may run into the millions. For James J. Ward, however, this fact is challenging rather than discouraging. A strong believer in, and practitioner of, theoretical methods of research, Jim believes that through the use of available technical data, the best possible combinations can be discovered readily. Often, his theoretical evaluations in the planning stage, make possible savings in both time and money on the experimental research conducted by his colleagues. Moreover, by checking research results against his theoretical data, scientists and engineers are helped in keeping their studies on the most effective path to sound conclusions.

Jim naturally is enthusiastic about the advantages of theoretical studies. Since joining Battelle in 1945, he has been able to steer many an investigation along the right road through the use of his voluminous data files and his trusty computer. During the decade, he has worked largely on chemical thermodynamics as applied to reactions and processes in the fields of chemistry, metallurgy, and ceramics. His calculations have contributed to the improvement of rocket fuels, materials and fuels for nuclear reactors, processes for the production of iron, aluminum, and titanium, ceramic materials for construction, and other processes and materials.

Before 1945, Jim had carried on studies on catalysts and on the equilibrium yields of products derived from ethyl alcohol in the research laboratory of Publicker Industries, Inc. Earlier, he had extensive experience in studies on the chemical structure of coal at the Clairton, Pennsylvania plant of the United States Steel Corporation. His studies on coke for blast furnaces contributed to data which led to the expansion of the firm's coke oven and washer facilities.

His willingness to tackle problems was demonstrated by Jim during his college years. While working in U. S. Steel's chemical department days, he attended classes nights to earn both his B.S. and M.S. in chemistry from Carnegie Institute of Technology. He carried on his studies for an Sc.D. degree in chemistry while a fellow in the Institute's Coal Research Laboratory.

While Jim has been prolific in the preparation of classified reports that seldom see the light of day, he has also been author of half-a-dozen manuscripts that have appeared in technical journals and books.

In his leisure time, Jim and his family, including two daughters, enjoy camping and picknicking. He is also enthusiastic about horseback riding.

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Organization of Research

RESEARCH IN INDUSTRIAL companies is organized in many different ways, depending on the size of the company, the scope of its operations, and other factors. In some instances, the type of organization is merely that which has evolved, without too much thought as to the best functional arrangement.

However research may be organized within the company, the organization is good as long as it is doing an effective job. But when a company is planning to start a research activity, a new company is being formed, or a long-established company is being reorganized, it is desirable to have some idealized pattern to follow. This pattern should, of course, incorporate the best industrial experience to date.

Such experience indicates that, whenever possible, applied research, basic research, and those activities normally handled by a trouble-shooting or control laboratory should be separated. In large corporations, this is the prevalent pattern—each of these activities being the responsibility of a separate division or department. This arrangement assures minimum interference with the planned programs of each group.

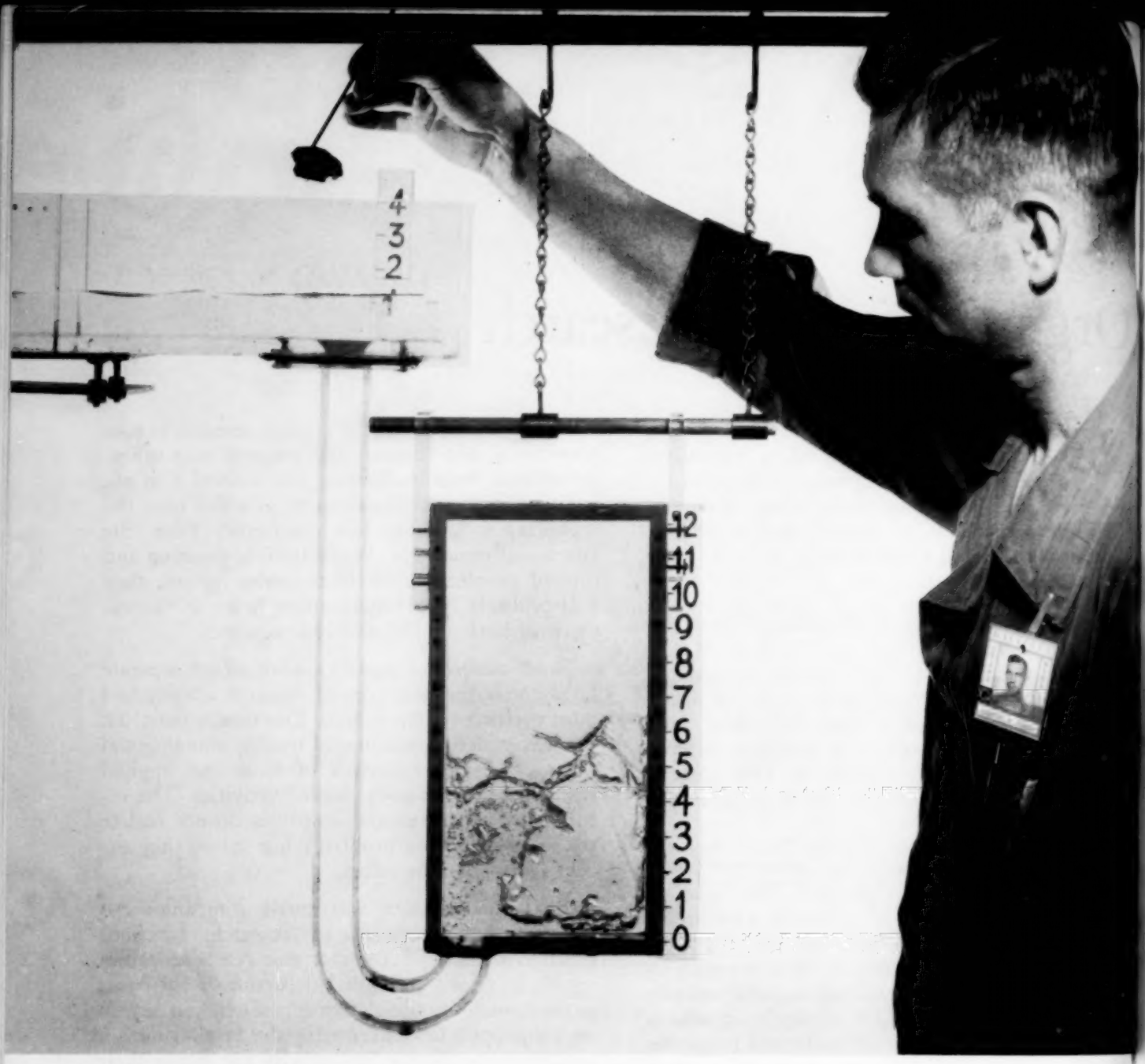
In medium-size companies, it is frequently necesssary to combine applied and basic research in one department. This is a departure from the ideal organization, but it usually works fairly well. There is a tendency, however, for applied research to take precedence, and fundamental research may suffer. Sometimes, trouble-shooting and control also are included in the one department, in which case, the organization becomes less satisfactory from the functional standpoint. When trouble-shooting and control problems come to the same group, they will probably be given attention first—at the expense of both applied and basic research.

Small companies usually cannot afford separate laboratories for each type of research activity and must perforce combine them. This results too often in the complete dominance of trouble-shooting and control and the reduction of basic and applied research to "catch-as-catch-can" activities. The result is that many small companies do not realize the progressive and profit-making values they expect from scientific effort.

Both medium-size and small companies can achieve the separation of research functions through the use of contract research. Companies unable to afford individual departments for basic, applied, and trouble-shooting research can set up well-equipped laboratories for the latter function and then use outside laboratories for either their applied or basic research, or for both. This assures positive separation of these activities, and enables the company to achieve, with minimum capital investment, what is equivalent to the functional organization of the large industrial corporation.

Clyde Williams

President and Director, Battelle Memorial Institute



MODEL MOLD

The transparent model in use here, helps foundrymen understand what goes on when they cast molten metal. The turbulence that shows up in the water in this scene is the result of poor gating practice (channel design). Such turbulence would tend to leave dirt and air bubbles in the completed casting. The use of transparent models for studying methods of improving gating practice was developed at Battelle. Technologists record the flow characteristics of the liquid by means of high-speed motion pictures. By varying the design of the channels leading the liquid into the mold cavity, the optimum gating practice can be developed.

Air Pollution, Each Plant's Problem

Control of its own pollutants is a matter of concern for every industry. Cost of planned control may be more than balanced by savings and improved community relations.

by Richard B. Engdahl

In recent decades, our country has undergone a substantial rise in its standard of living which has resulted in a distinct shift in attitudes toward the amount of dirt both on the ground and in the air which the average urban dweller will tolerate. Simultaneously, and as a necessary part of this revolutionary rise in the standard of living, there has been a growing concentration of population in many industrial centers. Often, industries that had hoped to escape air-pollution problems by building outside thickly populated sections, now find themselves surrounded by new residential areas because of community growth. Thus two converging influences have combined to accelerate the growth of air-pollution problems.

Many industries which have attempted to keep abreast of their own growth and its effect on pollution, may, nevertheless, be caught short because of changes in the community, its pride, and its rising standard of cleanliness.

When management fails to regard the abatement of air pollution as a justifiable concern of industry, an inescapable, urgent, and costly problem may creep up on the plant. But when responsible personnel are assigned to observe and evaluate the output of the company stacks, the growth of the problem can be no surprise. Its solution can then be handled efficiently by a competent technical staff.

Since his association with Battelle in 1941, Richard Engdahl has carried on and directed research on problems relating to fuels technology, combustion equipment, air-pollution measurement, and control of pollutants. As chief of the fuels and air pollution division, he is responsible for guiding area air-pollution studies carried on by the Institute. Prior to joining Battelle, he served as research assistant at the University of Illinois where he carried on studies on residential heating and cooling.

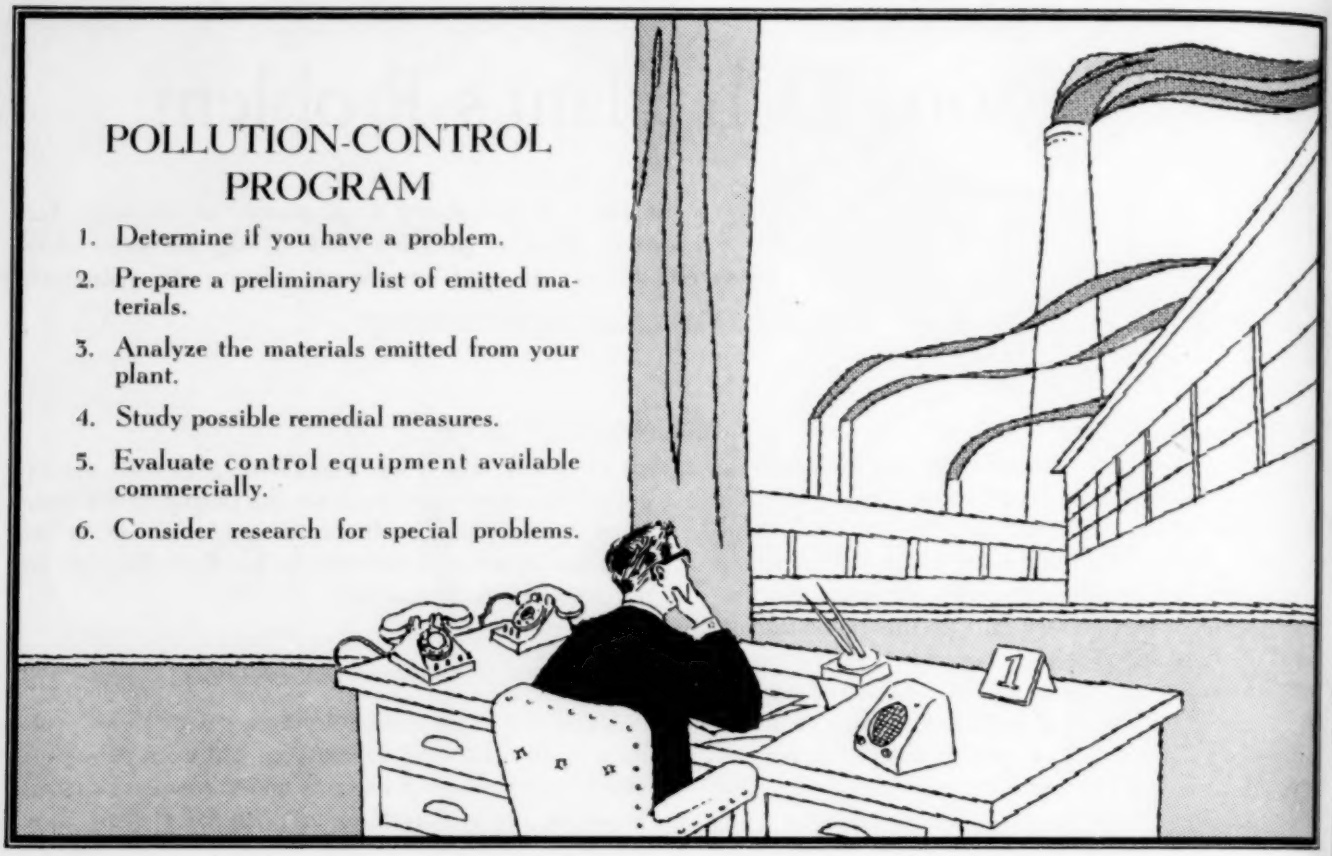
He is a key member of important committees of both the American Society of Mechanical Engineers and the American Society of Heating and Air Conditioning Engineers.

Recognition by Industry

More and more companies faced with these problems realize the need to continue and even to expand efforts to keep their pollutants under adequate control. Such activity is important to them for at least three reasons.

- Cleaning and protecting their products, or rejecting and reprocessing them because of dust, chemicals, and other waste products in the air may be such a large part of the cost of production that improved cleanliness is an economic necessity.
- Unsatisfactory living conditions that result from pollution may lead to difficulty in maintaining a high-caliber staff.
- Offense to the community may create a need for constant expensive efforts to build and maintain good will.

Reduction of pollution calls for careful planning. It cannot be done hastily. Companies have found themselves in positions where they were forced by public opinion to do something—almost anything—to reduce a nuisance obviously originating in a plant. Under public pressure and in the emotional situation that resulted from months or years of inaction, some of these companies made frantic efforts to purchase and install equipment without sufficient preliminary study. As a result, expenses were unnecessarily high, and there was still the possibility that the installations would not be adequate to meet the situation.


POLLUTION-CONTROL PROGRAM
1. Determine if you have a problem.
2. Prepare a preliminary list of emitted materials.
3. Analyze the materials emitted from your plant.
4. Study possible remedial measures.
5. Evaluate control equipment available commercially.
6. Consider research for special problems.

The first step toward control of air pollution is the company's recognition that its plant may be contributing to the pollution of the atmosphere in the community. Then if the company keeps up to date on the facts relating to its own effluents, it will be ready to launch a program for reducing pollution whenever that may become necessary.

The Necessity for Planning

One large plant, handling a tremendous quantity of raw materials each day, emitted an almost infinitesimal percentage of its daily output as a very fine fume. Because very finely divided material is highly visible even in small quantities, the neighbors began to complain. In spite of the obvious harmlessness of the effluent, local agitation became so intense that the company felt it must take action.

Because there was no time to make an adequate investigation of the characteristics of the fume, large sums were spent on equipment to remove the nuisance material from the effluent gases. Actually, the equipment was unsuited to the purpose. As a consequence, offensive emissions continued.

The situation demanded more careful analysis than the company permitted itself. Had study been started earlier, and had it included all the characteristics of the material in question, the company would have found that suitable equipment was available for handling its problems. This equipment could have been installed without revamping the entire plant. Neglect left the company facing a serious problem even after it had spent a large sum for relief.

Limitation of pollution may be expensive, but the failure to control the emission of pollutants is almost certain to be even more costly. The budget for construction of some new chemical plants must allocate as much as 10 per cent of the total expenditure to pollution control. In addition, management must undertake the continuing expense of operating the required equipment. The very fact that these costs are likely to be high makes careful preliminary study, and selection of methods, matters of high economic importance.

The amount of study required will vary from plant to plant. For one company, under pressure for the abatement of dust and corrosive mists, a brief survey was sufficient. Specialists were able to measure the

amount of pollutants, to study and recommend process changes to reduce material losses, and to survey commercially available equipment to abate the important emissions, all in a relatively short time. The cost to the company was moderate.

Another plant required a much longer and more elaborate study. This included a detailed, continuous determination of the patterns of pollution in the vicinity of the plant over a period of years, the effects of gases on vegetation, and the rate of dust fall in the community. It included extensive studies of alternative processes and devices for abatement of pollutants. Naturally, such a program involved a much larger investment than the simple study mentioned above. Both followed a similar pattern, and each may result in substantial long-term savings to the companies involved. The objectives and the general procedures were similar.

A Six-Step Program

Years of work in the scientific control of air pollution have resulted in development of a number of effective techniques. They are used for evaluating pollution problems, determining what equipment will best fit the intended purpose, checking its performance after installation, and planning the modifications required to accommodate changes in the plant's area and its production methods. In general, there are six steps in a positive approach to control of air pollution.

1. *Check to determine if a problem exists.* Materials emitted by many manufacturing processes require no special treatment. They may be sufficiently dispersed by the prevailing atmospheric conditions of the area. To determine whether the effluents from a particular plant or operation fall into this category, or are potentially objectionable, it is best to employ a team of well-trained and experienced technologists who can furnish the necessary specialized equipment, and who will study the materials without bias. Their professional objectivity and technical skill enable them to obtain significant data and to make a dependable report on actual prevailing conditions.

2. *Prepare a preliminary list of emitted materials.* On the basis of available knowledge of plant processes, specialists and regular plant personnel together can usually make a surprisingly complete preliminary list of emitted materials. Estimates of the amount of effluent from various locations can be checked against known values on similar processes and on the same process in other plants. When the resulting estimates differ widely from expected values, rough measurements of the quantity of effluent are usually made. Because many atmospheric variables have large effects on the concentration of emitted material, there is usually no point in getting a precise quantitative measure at any given time. When no estimate is practical, direct sampling at the process outlet must be used.

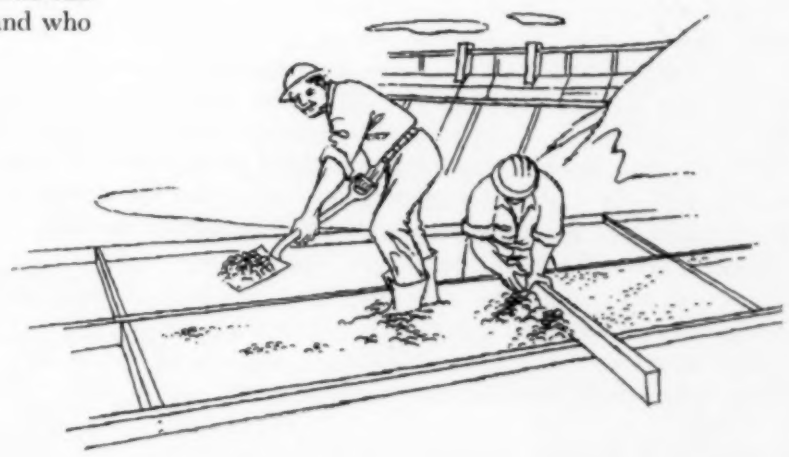
3. *Analyze the effluents.* By first determining that a problem exists and then establishing its approximate magnitude by means of a preliminary inventory, trained specialists may be able to gain necessary information without carrying out the collection processes that are characteristic of the later stages of air-pollution study. Sometimes it is necessary to go much further.

If the vegetation in the area has suffered damage, examination by a plant pathologist will help to reveal the causes for that damage. Chemical analysis of healthy and damaged foliage may rule out some suspected causes. Some plant species known to be especially sensitive to particular pollutants may be found in the area, or they may be deliberately planted for observation.

Damage to the plants may be identified. Unfortunately, damage to community health is less readily assessed. For such assessment, elaborate long-range epidemiological studies are required.

The amounts of emitted materials characteristically found in the community atmosphere may be measured.

Fly ash is now widely used as a light-weight aggregate in the making of concrete.



Some gases can be measured continuously by automatic recorders. Others can be sampled periodically and analyzed in the laboratory. This latter procedure requires the design and execution of a sampling program that will allow for all the variables affecting the dispersion of gases in the atmosphere.

Sampling devices for determination of dusts and aerosols are available. Analysis may be accomplished by emission spectroscopy, by X-ray or electron diffraction, perhaps even by petrographic microscopic examination.

4. *Study remedial measures.* When the nature and extent of the problem have been established, the technologists are ready to consider practical means for controlling the pollutants that may be the offenders. Not all effluents need treatment. The disposal of all innocuous gases, and even of many untreated noxious gases to the atmosphere is necessary and proper, so long as it is done without depriving the neighbors of the enjoyment of their property. The natural dispersive powers of the air are tremendous. It is only overloading the atmosphere that causes difficulty.

5. *Evaluate available equipment.* Equipment for abating most major effluents is now available commercially. The areas of effectiveness of existing methods are being extended, and new methods are being developed. Some new methods and new equipment have been accepted too optimistically, however. The wise plant manager waits for objective data on performance to demonstrate the suitability of a method before he invests in it as a solution to his problem.

One example of the improvement of conventional equipment relates to the bag collector, whose range of effectiveness has been markedly extended in recent years. The natural fibers formerly used in its construction had limited the temperature range within which it was applicable. Synthetic fibers have raised the temperature ceiling considerably.

6. *Consider research for special problems.* No commercially available equipment has been designed for the abatement of certain troublesome emissions. Applied research can be expected to continue to uncover practical, and perhaps even self-liquidating processes, for an increasing number of pollutants.

Once, the volatile products of coke making were allowed to cloud the countryside near steel mills. Now and for many years the gases evolved have been retained and converted into salable merchandise. Similarly, dust-laden blast-furnace gas, once blown into the atmosphere, has for a long time been scrubbed, dedusted, and used as fuel.

Through research, other profitable processes can be developed for what are now costly abatement programs. Plants and entire industries that have not yet faced up to the economic implications of air pollution have neglected one of their major opportunities for progress. Finding the sources of pollution, controlling them, and converting the pollutants into useful or at least harmless forms is a growing job. Planning an abatement program scientifically and putting it into operation early will add efficiency to the entire plant, and will help to maintain better relations within the industrial community.

TIMETABLE

" . . . As a rough generalization . . . a highly significant discovery is confirmed, attested, and accepted by leaders in its special field perhaps within a decade; it becomes understood and accepted by the general body of scientists in that field within the generation; and sometime during that century it will be generally accepted by literate mankind."

Alan T. Waterman, Director of
National Science Foundation

"Tailor Made" Steels

Increasing specialization in products and processes and higher demands upon materials are being met by the development of steels "tailor made" to solve specific problems.

by A. M. HALL

ONE OF THE MAJOR TRENDS IN applied research and development in metallurgy today is specialization of metallic materials. Prompted by demand and necessity, there is a steadily increasing tendency to "tailor make" a metallic material for a particular use or a relatively narrow group of uses. Although this trend is more evident in steel metallurgy, it is equally strong in other branches of metals technology.

Increasing specialization in products and processes and higher demands upon materials in the form of tremendous stresses, very high temperatures, and specialized needs call for steels to meet the specific conditions. In many instances, existing compositions will not do the job. In other cases, available steels may give indifferent service, proving costly because of the necessity of frequent replacement or poor performance.

As a result, each year ushers in a large crop of "new" materials. Some of them are soon discarded, but others ripen into important engineering materials. The bulk of the crop are modifications of existing materials and represent extensions of knowledge in the corresponding areas of metallurgical technology. In many cases, the new development represents improved know-how in the production and use of existing materials. A few of the materials are genuinely new and their development has involved major technological contributions. In most cases, extensive research is involved in the new developments. The following discussion presents some recent "tailor-made" steels and indicates what the metallurgist can do to solve specific problems.

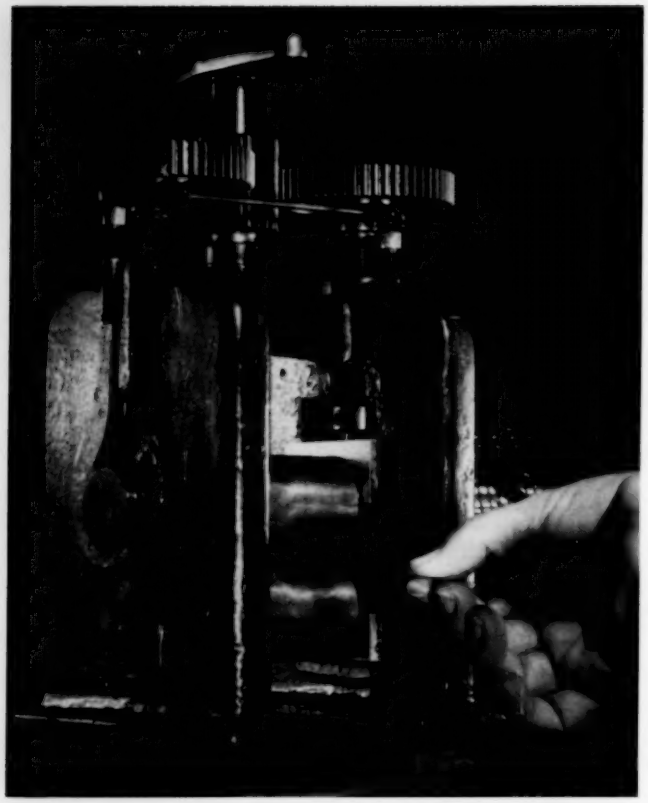
A. M. Hall has an intense interest and wide experience in the field of physical metallurgy. A member of the Battelle staff for a decade, he has supervised investigations on the development of such materials as electrical resistance alloys, stainless-type casting alloys, and compositions for high-temperature uses. He has also directed research on varied methods of metal fabrication. Before 1945, he served as a research metallurgist with the International Nickel Company. A prolific writer, Hall is the author of the recently published monograph, *Nickel in Iron and Steel*. He is active in professional societies on the local as well as the national level.

ULTRA-HIGH-STRENGTH STEELS

During the past few years, a variety of low-alloy hardenable engineering steels have come into use where ultra-high strength combined with acceptable ductility, fatigue strength, and notch toughness are called for. The steels of this group include some well-established conventional grades, as well as some new compositions. These steels were used originally in aircraft landing gear and airframe components because their higher elastic modulus, together with high strength, gave them a definite advantage over aluminum alloys. They are also used for machine and automotive components, shafting, gears, and other applications where high strength is required.

One of the first steels used for such applications was AISI 4340, which is comparatively notch tough when heat treated to 180,000-psi tensile strength. However, at higher strength levels its notch toughness drops sharply. Intensive research on conventional compositions has resulted from the demand for higher strength combined with acceptable toughness and fatigue strength. The demand also led to re-examination of the aircraft industry's requirements, as well as the development of several new ultra-high-strength steels.

Exhaustive studies indicate that, if AISI 4340 is



Making a strip specimen for laboratory evaluation of a wrought alloy—one of the early steps in alloy development.

heat treated according to a special schedule, it can be hardened to 260,000-280,000-psi tensile strength, while its other mechanical properties remain acceptable. This steel compares favorably in impact properties with, and is superior in fatigue properties to, the aluminum alloys that have given satisfactory service in landing-gear components and attachment points. The adaption of AISI 4340 to ultra-high-strength applications exemplifies tailor making through improved know-how.

The above-mentioned ultra-high-strength steels that have been developed recently are deep hardening, similar to AISI 4340. To retain as much ductility and toughness as possible, the carbon content is held to the minimum required for the attainment of the desired strength (about 0.25-.040 per cent). The elements silicon, manganese, chromium, nickel, and molybdenum are balanced to produce the desired depth of hardening, and to prevent the formation of microconstituents other than martensite, which would be undesirable.

Several factors limit the use of steels hardened to very-high-strength levels. These include instability at elevated temperatures, susceptibility to stress corrosion, decarburization, and hydrogen embrittlement. Steps can be taken to overcome some of these disadvantages. At the same time, ease of fabrication and price are important advantages. Much research remains to be done to make these steels more satisfactory, as well as to meet the pressure of the aircraft industry for ever higher strength-to-weight ratios. The development of suitable steels with tensile strengths over 400,000 psi will not be surprising.

Low-Alloy Steels for High-Temperature Service

Large tonnages of low-alloy steels are used in a variety of elevated-temperature applications up to about 1100 F. Prominent among such uses are steam piping, boiler and superheater tubing, plate and piping for oil-refining equipment, and structural components for furnaces and chemical processing equipment. Frequently, these steels contain molybdenum or molybdenum and chromium as alloying elements.

Recent developments have shown that the elevated-temperature properties of such steels can be increased significantly by small additions of titanium and boron, although the maximum service temperature is not affected appreciably. Both elements must be added to attain the desired properties. Boron should be added in amounts of 0.01-0.1 weight per cent, and the titanium content should be approximately 2 to 4 times the carbon content to secure the desired properties. The combined effect of boron and carbon seems to be related to their ability to form a hard low-temperature transformation product exceptionally resistant to tempering.

Maximum elevated temperature strength properties are obtained by quenching from 2000-2100 F. As an illustration of the effect of titanium and boron, a 0.15 per cent C—3 per cent Cr—1 per cent Mo steel has a rupture strength of 11,500 psi for 1000-hour life at 1100 F, while a 0.06 per cent C—3 per cent Cr—1 per cent Mo—0.30 per cent Ti-B alloy shows a rupture strength of 30,000 psi for 1000 hours at the same temperature. This exemplifies tailor making through research and development.

Low-Alloy High-Strength Steels

Over the years a special family of steels has emerged which is tailored to a variety of tonnage applications requiring a relatively inexpensive, high-strength, easily fabricated and readily welded construction material. Typical uses include railroad rolling stock, shovel buckets, mine-car bottoms, bus and trailer bodies, earth-moving equipment, low-temperature turbine

buckets, and pressure vessels. A common denominator of these applications is that they usually involve outdoor service and a penalty for dead weight. Hence, high strength and resistance to corrosion by the atmosphere are important materials requirements. This family of low-alloy high-strength steels comprises some 20 proprietary compositions.

A newcomer to the family is the low-carbon, low-alloy steel possessing high strength combined with good ductility and impact properties. The major alloying elements are small quantities of nickel, chromium, molybdenum, copper, and boron with 0.15 per cent carbon. The compositions may be varied to meet various minimum tensile-strength requirements. It is available as constructional plate material, hot-rolled bar stock, and forgings. The steel is heat treatable, and optimum properties are obtained by water quenching from 1650 F followed by tempering at 1150-1200 F, and quenching to room temperature. Preheating is unnecessary for welding if low-hydrogen electrodes are used, and welded joints possess 95 per cent efficiency without a stress-relieving heat treatment. The steel exhibits excellent toughness, and is reported to be satisfactory for subzero-temperature applications down to —50 F.

Specialty Alloys

Other recent research has resulted in further development of iron-aluminum alloys. One alloy in particular, known as Thermenol, contains approximately 14 per cent aluminum, 4 to 5 per cent molybdenum, with the balance iron. Initial interest resided in its superior magnetic properties and high electrical resistivity. It is characterized by very high magnetic permeability and low hysteresis losses. Because of these properties, the alloy may be satisfactory for electronic applications and as transformer core material.

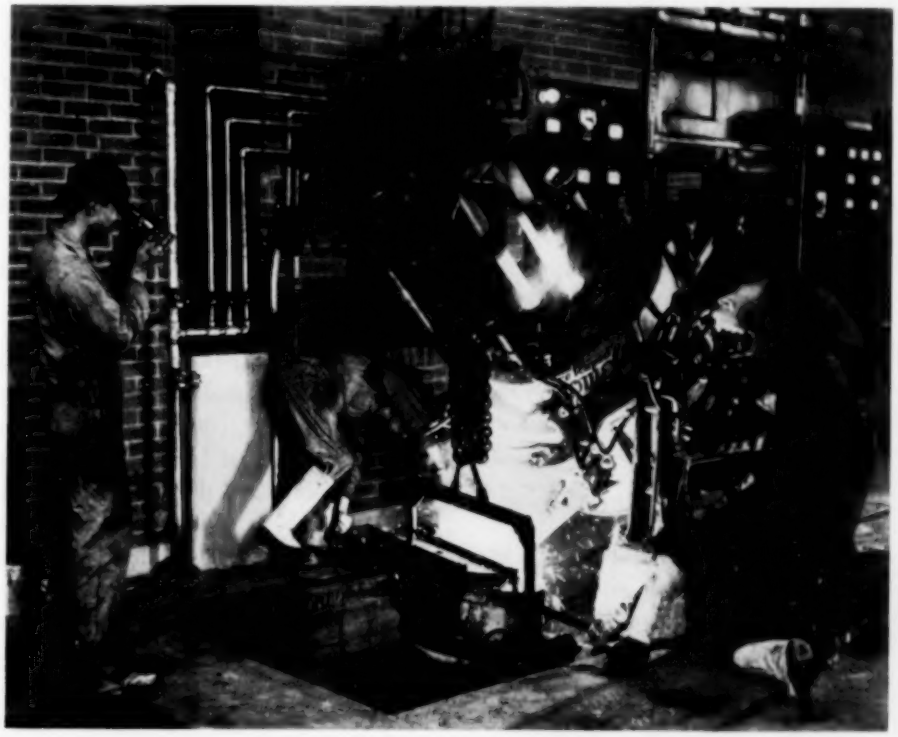
The fabrication of iron alloys containing more than 6 per cent aluminum is difficult since such alloys are extremely brittle. However, the higher aluminum alloys can be fabricated if a rigid work schedule is followed carefully. The alloys are forged at 1800 F, and are hot-rolled at 1000 F with approximately 0.005-inch reductions per pass. By further cold rolling, very thin strip material may be obtained; strip as thin as one-half mill has been successfully produced in the laboratory.

Because of exceptional oxidation resistance, due to the formation of a thin, adherent, protective film of aluminum oxide, Thermenol is attractive for elevated temperature applications. At 1800 F, the oxidation rate is approximately 0.008 in. per year. Creep properties are similar to those of AISI Type 310 stainless steel. Other important features are its low coefficient of thermal expansion and its excellent bonding properties to glass.

Tool Steels and Steels for Machining

Improvements have been made recently in the field of high-alloy tool steels. These developments have been based on the principle that if elements can be added to engineering steels to make them free machining, why can't additions be made to tool steels themselves to improve their machinability likewise? The evidence indicates that this is a sound proposition.

Tapping a heat of experimental alloy from a 250-pound direct-arc furnace in the Battelle process-metallurgy laboratory.



Sulfurized Tool Steels. Various grades of Mo-W-V, Cr-Mo-V, and high-carbon, high-chromium, high-speed, and hot-work steels are available which have been sulfurized to improve their machinability. Substantial savings in tool production can be realized by sulfur additions without adverse effects on toughness and other mechanical properties. Moreover, sulfurized tool steels seem to perform better than conventional types. Sulfurized grades appear to have better cutting edges, and need less frequent sharpening. Sulfur additions are not detrimental to fatigue strength or forgeability if the sulfur content is carefully controlled. The optimum value seems to be about 0.12 per cent.

Sulfides in tool steels apparently act as internal lubricants that decrease frictional heat. Here the role of sulfides is different from their function in free-machining steels, where the sulfide inclusions break up the chips. Sulfides are added to tool steels as molybdenum disulfide or iron sulfide, and successful application depends on the ability to produce sulfides randomly dispersed in the matrix, and not as elongated stringers at grain boundaries. It has been observed that the sulfide particles tend to be associated with the carbides in steels, and hence the dispersion of sulfide particles is easily attained.

Leaded Machining Alloys. While on the subject of machining, the new leaded low-alloy engineering steels may be mentioned. For a number of years, leaded free-machining plain-carbon steels have been available. Recently, the addition of lead has been extended to such low alloy steels as AISI 4140 and 8620 with increases in cutting speeds of 25 to 50 per cent. Annealed leaded AISI 4140 can be cut at the same speeds as C-1117, a high-carbon high-manganese steel with a machinability rating about 85 per cent that of B-1112 (standard low-carbon free-machining steel). The heat-treated leaded alloy steel machines 50 per cent faster than a heat treated alloy steel of comparable analysis without lead. It is reported that leaded AISI 4140 responds to heat treatment in the same manner as the unleaded grade, with equivalent ductility and notch toughness.

Powder-Metallurgy Products

In the powder-metallurgy field, some recent developments have been concerned with more extensive application of sintered iron powders for special purposes. The use of these materials for cartridge cases is an example, although this application is still in the developmental stage. Some success has been attained in deep-drawing the pressed and sintered preforms into the finished products. Hydrogen-reduced iron powder is normally used for these processes rather than the more expensive electrolytic iron powders.

Alloy steels. Research has shown that the mechanical properties of iron-powder compacts can be improved greatly by the addition of carbon, nickel, chromium, and other alloying elements. Better properties are obtained if chromium and nickel are introduced in the form of prealloyed powders rather than as the powders of the individual elements. Normally, one per cent carbon is used. Compacting is carried out under 50-psi pressure while sintering is done in dry hydrogen at 2200 F for one hour. Shrinkage of parts is of the same order of magnitude as for regular iron parts. The addition of lubricants improves processing. The best alloy additions thus far are 2.5 per cent of prealloyed 80 per cent Cr—20 per cent Ni powders or 7.5 per cent of prealloyed 50 per cent Cr—50 per cent Ni powders.

These powder-produced alloy steels have high strength properties and excellent wear resistance. The sintered products respond well to heat treatment. Potential applications of sintered alloy-steel powders include gears, cams, rollers and eccentrics, and other intricate parts.

Infiltrated Products. Work has continued in the development of infiltrated powder-metallurgical products. The technique involved here is the production of porous sintered metal skeletons, followed by impregnation with materials of good wettability and limited solubility for the parent skeleton. During impregnation, the temperature is close to the melting point of the infiltrant, and the time is controlled to limit alloying. The melting point of the infiltrant should be considerably lower than that of the parent material.

Infiltrated products have greatly improved properties because impregnation, by filling the pores remaining from the sintering operation, reduces the number of "internal notches" inherent in a sintered compact. Great increases in strength are thereby possible. The attainable properties depend on the wettability and solubility relationships of the impregnant.

Various applications of such materials are presently being realized. Teflon-impregnated products are being utilized as self-lubricating bearings. Refractory oxides have been impregnated with liquid metals. Tungsten or molybdenum compacts infiltrated with copper or silver are used as electrical contacts. These are resistant to wear, are nonsticking, and have very low losses from arcing.

Copper-Impregnated Materials. Copper-impregnated sintered iron materials are presently being used for compressor stator blades in the J-35 turbojet engine where resistance to impact and fatigue are required. A 50 per cent saving in cost over that of a forged AISI 403 stainless steel blade is reported. The compact contains about 25 per cent Cu and up to 1.0 per cent C and 0.3 per cent Si. The mechanical properties are 100,000-psi tensile strength, 75,000-psi yield strength, and 6 per cent elongation in 2 inches. This material is also being used for such applications as washing-machine-wringer drive gears as well as gears for business machines. In such applications, it replaces hot-rolled C-1015 steel which must be pierced, flattened, and machined.

What About the Future?

The forces that have stimulated the general technological growth of the United States are, by their nature, responsible for the trend toward specialization of metallic materials. We have every reason to expect the technological growth of the country to continue, and probably to accelerate. Therefore, it can be anticipated that the demand for specialization or tailor-making will continue and strengthen.

Iron is plentiful and will continue into the distant future to be one of the important pillars of material civilization. Though iron-alloy systems have already contributed scores of special compositions developed for particular uses, the potentialities of iron alloys for further tailoring are enormous. Much remains to be done. Many demands are unmet or only partly satisfied.

The trends in the aircraft industry place an increasing premium on materials of high elastic modulus and high strength-to-weight ratio. Iron alloys have made a good start in meeting these requirements, but much improvement is necessary. More research is needed to work the "bugs" out of present super-strength, hardenable steels. These steels are currently being considered for use at strength levels up to 290,000-psi tensile strength. Efforts to develop much stronger steels with satisfactory ductility, toughness, and fatigue strength are worth while.

The aircraft industry will also need a reasonably oxidation-resistant material of good formability capable of retaining high strength at temperatures up to about 700 F. Present age-hardenable stainless steels are a step in this direction. However, they need much further development, particularly with regard to consistency of mechanical properties and simplification of heat treatment.

The power industry could use a high-chromium tube steel that is weldable and has good creep resistance up to at least 1200 F. It should contain perhaps 25 per cent chromium to improve its resistance to flue-gas atmospheres.

There would be many uses for a low-alloy steel of superior resistance to atmospheric corrosion, for ultra-high-strength cast steels, for straight chromium stainless steels of improved cold formability, for an iron-base "superalloy", and for a stainless steel that won't pit in sea water. These are just a few examples; the list could go on and on.

DESTINY OF SCIENCE

"It is the great destiny of human science, not to ease man's labors or prolong his life, noble as those ends may be, nor to serve the ends of power, but to enable man to walk upright, without fear, in a world which he at length will understand and which is his home."

Paul B. Sears, in *Charles Darwin*

Notes From Battelle

SPOT WELDING TITANIUM

USERS OF TITANIUM and titanium alloys are faced with the problem of making joints that are satisfactory for fabricating useful structures. Attention has been given to the development of satisfactory arc-welding procedures for titanium and its alloys. However, there has been much less study of spot welding until recent Battelle investigations sponsored by the Wright Air Development Center.

W. H. Kearns, W. S. Hyler, and D. C. Martin report that the purpose of the Battelle investigations was to determine the behavior of weldments in titanium and titanium-alloy sheet under fatigue loading and to evaluate the fatigue behavior of spot weldments in titanium, 24 S-T and 75 S-T clad aluminum alloys, and Type 321 stainless steel sheet. The metallurgists found: (1) the joints in stainless steel were slightly better in fatigue than like joints in titanium; (2) joints in titanium were significantly better than in clad aluminum alloys; and (3) under static tension-shear loading, the joints in the titanium materials were stronger than similar joints in the stainless steel and aluminum alloys.

BETTER MOLYBDENUM COMPOSITIONS

CONTINUING ADVANCES IN heat-engine design call for materials with ductility and resistance to mechanical and thermal shock and high strength and stability above 1600 F. For this reason ceramic compositions are not fully satisfactory, and metals with outstanding high-temperature properties are needed. Molybdenum is a logical metal for such use because, in addition to its high-temperature properties, it is easily worked and is the most abundant of the very few very-high-melting-point materials.

R. I. Jaffee, chief of the Institute's nonferrous physical metallurgy division, and his colleagues report that they have found a method for imparting greater strength to molybdenum for use at temperatures up to 2000 F. Their new method involves combining molybdenum with fine dispersions of various oxides by powder-metallurgy techniques.

The strength of the new molybdenum compositions may be seen by comparing their behavior in creep tests with that of metallic molybdenum alloys. Thus, the best of the metallic alloys prepared in the study lasted 292.7 hours in a creep test at 25,000 psi at 1800 F. The best of the compositions containing oxides, however (Mo 0.5—ZrO_2), lasted 600 hours in a test at 1800 F. Moreover, the stress required to fracture the specimen had to be increased to 40,000 psi from the original level of 25,000 psi during the first 500 hours. The rupture strength of molybdenum at 1800 F can be increased three- to fourfold by dispersion of very small amounts of suitable oxides. This is accomplished without adversely affecting hot workability or room-temperature ductility.

GILLETT LECTURE

THE FOURTH ANNUAL H. W. Gillett Memorial Lecture will be presented before the American Society for Testing Materials in Atlantic City, New Jersey, this month. Professor F. V. Lenel, who heads the Department of Metallurgical Engineering at Rensselaer Polytechnic Institute, will deliver the lecture. His subject is "Metal Powder Compacts and Products".

The Gillett Memorial Lecture, which is an annual feature at ASTM meetings, is sponsored jointly by the Society and Battelle. Dr. Gillett was one of America's leading metallurgists and the first director of Battelle Institute.

TOWARD FREE COMMUNICATION

SCIENCE IN GENERAL, and chemistry in particular, have a long tradition of free communication. However, present-day considerations complicate the free interchange of ideas. Dr. B. D. Thomas, Battelle's associate director, pointed out at the Cincinnati, Ohio, meeting of the American Chemical Society.

Confusion in the communication of scientific and technical ideas results from the dilemma created, on the one hand, by the desire to communicate, and on the other, by the necessity to safeguard technical information for political, military, or competitive economic reasons. "It will take a Solomon to find the best solution to this knotty problem."

"It is to be hoped," Thomas declared, "that regulations on the communication of information will be drawn with care and administered with due consideration to the realities of technology today. Only through a patient course of re-establishing the confidence we once had in the international exchange of scientific information, can we arrive at the mutual benefit that exchange can give."

THE LIQUID-SOLID CYCLONE

THE WET, OR LIQUID-SOLID, cyclone is a relatively new type of equipment for separating and classifying solid materials suspended in water. Because of its recent development, the literature on the device has been rather widely scattered. Cognizant of the interest of mining, metallurgical, and chemical engineers in the wet cyclone, O. F. Tangel and R. J. Brison of Battelle's minerals beneficiation division have prepared a bibliography on the subject. Their listing, *Bibliography of the Liquid-Solid Cyclone*, covers 105 of the items that have appeared in the literature to the present. It is available from the Battelle Publications Office, 505 King Avenue, Columbus 1, Ohio.

STUDY OF FATIGUE FAILURE

DESIGN OF STRUCTURES and machine parts to lessen possibility of fatigue under repeated stressing is becoming increasingly important. Because of the importance of this problem in aircraft construction, the Airframe Design and the Publications Divisions of the Navy Bureau of Aeronuatics commissioned Battelle to survey the present state of knowledge and prepare a book to provide additional help to the designer. The book, *Fatigue of Metals and Structures*, was prepared by Institute staff members H. J. Grover, S. A. Gordon, and L. R. Jackson. It has been published and is available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

The volume presents a comprehensive report on fatigue failure. It covers the effect of combined stresses, stress concentrations, surfaces, size and shape, high temperatures, and other factors in fatigue strength. Also included are discussions of fatigue characteristics of engineering materials, components, and composite structures and chapters on methods of using fatigue data in design and of detecting and combating fatigue.

TRAILER-COACH STUDY

AN ENGINEERING STUDY of design and safety factors in mobile home trailer-coach construction was recently completed at Battelle. The study was aimed primarily at evaluation of the relative contributions of chassis, floor, wall, and roof to the over-all structural strength of trailer coaches. The effect of wheel suspension on the smoothness of the ride and the design of the hitch were also investigated.

The study, which was conducted for the Anderson Coach Company by E. D. Abraham and G. M. McClure of Battelle, demonstrated the complete engineering adequacy of their modern trailer coach from the safety standpoint. A standard production-model coach, weighing 6900 pounds, was shown to have a safety factor of three to one, which represents an overload of more than ten tons. The investigation also led to the development of a method of wall-to-floor assembly that gives increased strength between floor and sidewalls. Improvements were also shown to be possible in the design of the floor, chassis, and hitch.

BETTER APPLIANCE CONTROLS

INCREASES IN THE PRODUCTION of automatically controlled appliances are broadening the demand for improved controls. Even ten years ago, many household appliances were controlled by simple on-off switches. The increasing complexity of newer appliances such as washer-dryers calls for such complicated combinations of controls as timing motors, solenoids or relays, thermoswitches, and pressure switches to carry out their cycles of operations.

There is no doubt that such controls are effective as well as low in cost. As more involved processes have to be controlled, however, manufacturers would be well-advised to consider nonlinear elements, according to B. H. List and R. L. Merrill of Battelle. They point out that such static elements as magnetic amplifiers, and others, offer real advantages. These include long life, ruggedness, freedom from maintenance, low operating cost, and control possibilities not readily obtainable in other components commonly used in appliance control. Such advantages will help manufacturers give consumers better and more reliable products.

NEW PAPER-COATING PROCESS

A NEW DRY PROCESS FOR coating paper has been developed at Battelle for the Bergstrom Paper Company. The process, which has reached the pilot-plant stage, employs finely divided powders as the coating materials. The coating powder is charged electrically, while suspended as a dust cloud in the air, and then deposited on the web in strong electrostatic fields. The coatings used in the process are usually pigments blended with a heat-sensitive binder, although paper can also be coated by the process with mica, flock, carbon, and wax or with clear plastic films.

The process was described before the recent TAPPI Coating Conference by R. B. Reif, of Battelle's graphic arts division. He pointed out that the new process compares favorably in cost with conventional methods. It is particularly suited for small-job work and specialty coatings, but can also be recommended for many of the better known types of coated papers as well as for unique coated products in web form.

ELECTRONICS COMPILATION

A COMPILATION, *Abstracts of the Literature on Semiconducting and Luminescent Materials and Their Applications*, has been issued recently by The Electrochemical Society. It is designed to aid persons interested in the subject to keep up with the published materials now appearing in more than 50 periodicals throughout the world.

The planning for this 1953 issue of the *Abstracts* was handled by the Management and Editorial Commitee of the Electronics Division of the Society. The tasks involved in collecting, editing, and evaluating the many references were performed by members of Battelle's solid state devices division as well as other Institute staff members.

The compilation is published by John Wiley & Sons, Inc.

TECHNICAL ADVISORS

THREE VETERAN Battelle staff members have been appointed technical advisors. Each will advise the Institute's clients in industry on the formation of research programs.

H. Maurice Banta, will work closely with the Institute's clients in the iron and steel and metal fabricating industries. He will continue also his close association with technical studies of petroleum and gas drilling, production and drilling equipment, and pipeline installation and maintenance.

Dr. Ray E. Heiks, in his new position is representing Battelle in its relationships with the chemical and allied industries.

Loran S. O'Bannon, will provide liaison between the Institute and its clients in various fields. A veteran of 20 years in research, he has been associated with ceramic studies at Battelle since 1942.

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A "Colloquy on Unusual Metals" was held recently at Battelle's Geneva laboratories. Bruce Gonser, Institute technical director, spoke on the subject of the conference, after which the visiting scientists and engineers participated in a general discussion which grew out of the presentation. Representatives of organizations in Switzerland, Italy, and France were present at the colloquy.

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Dr. Iver Igelsrud has been placed in charge of all technical information services at Battelle. Included in his new assignment is the coordination of the Institute's research on the development of improved methods, both manual and automatic, for organizing, storing, and searching information.

In addition to the development of information systems, Battelle's technical information services include those performed by the staff of the Institute's 32,000-volume library, which receives some 1250 periodicals in numerous languages, and those performed by abstracting, indexing, and bibliography specialists. Typical of the tasks performed by the group is preparation of abstract material for the *ASM Review of Metals Literature* and the *Battelle Technical Review*.

As chief of the division of technical information, Igelsrud heads a staff of 150 scientists and information specialists.

Writings by Staff Members*

Brazing Molybdenum for High-Temperature Service. M. I. Jacobson and D. C. Martin. *Welding Journal*, February, 1955, pp. 65S-74S.

Development of methods for producing brazed joints in molybdenum that would have sufficient strength and ductility. Induction brazing in an argon atmosphere was the most satisfactory from the standpoint of braze quality and practicability.

Journal of Metals, American Institute of Mining and Metallurgical Engineers, Transactions, January, 1955. Contains these papers by Battelle staff members:

Contribution of Crystal Structure to the Hardness of Metals. W. Chubb. pp. 189-192.

Measurements of the hardness of pure cobalt, iron, titanium, uranium and zirconium near their transformation temperatures show that crystal structure provides a basic contribution to strength of metals at elevated temperatures, which is related directly to the complexity of the structure.

Solution Rate of Solid Aluminum in Molten Al-Si Alloy. C. M. Craighead, E. W. Cawthorne, and R. I. Jaffee. pp. 81-87.

Presents quantitative data demonstrating the effect of time, temperature, agitation, and composition of solvent bath and solute metal on the rate of solution of aluminum in molten aluminum-silicon alloys. This information could be applied in melting operations, extractive processes, or in brazing.

Heat Treatment and Mechanical Properties of Ti-Cu Alloys. F. C. Holden, A. A. Watts, H. R. Ogden, and R. I. Jaffee. pp. 117-125.

An investigation of a Ti-base alloy system that contains an active eutectoid decomposition. The effect of heat treatment and microstructure on mechanical properties was determined.

Effect of Alpha Solutes on the Heat-Treatment Response of Ti-Mn Alloys. H. R. Ogden, F. C. Holden, and R. I. Jaffee. pp. 105-112.

The strengths of Ti-Mn alloys are greatly increased by the addition of alpha solutes. They also have a significant effect on the transformation rate of beta to alpha. The substitutional-alpha solute, aluminum, decreases the rate of formation of alpha from beta, while the interstitial elements, carbon and nitrogen, increase the rate of formation of alpha from beta.

Structure and Properties of Ti-C Alloys. H. R. Ogden, R. I. Jaffee, and F. C. Holden. pp. 73-80.

Alloys of titanium with carbon do not respond to heat treatment in the same manner as do iron-carbon steels. Only small increases in strength result from heat treatment. Rather, carbon increases the strength of titanium by dissolving in the alpha phase.

Study of the Effect of Boron on the Decomposition of Austenite. C. R. Simcoe, A. R. Elsea, and G. K. Manning. pp. 193-200.

Describes an investigation of the relationships between boron content, prior thermal treatment, and the nucleation and growth rates of austenite transformation products in steels. Data are presented which show that a small but critical amount of boron is required to give the optimum increase in hardenability. A mechanism which explains the large increase in hardenability of steels with very small additions of boron is suggested.

Physical and Mechanical Properties of Rhenium. Chester T. Sims, Charles M. Craighead, and Robert I. Jaffee. pp. 168-179.

Discusses methods of fabrication of rhenium, its physical and mechanical properties, and oxidation resistance.

Journal of Metals, American Institute of Mining and Metallurgical Engineers, Transactions, February, 1955. Contains these papers by Battelle staff members:

A Study of the Room Temperature Fatigue Properties of Molybdenum. W. L. Bruckart and W. S. Hyler. pp. 287-290.

Reports results of an initial study of rotating bending fatigue of powder metallurgy and arc-cast types of molybdenum. Fatigue limits were good in both notched and unnotched specimens.

Ductility of Vacuum Heat-Treated Molybdenum Wires. W. E. Few and G. K. Manning. pp. 343-344.

Discusses how heating rates used during vacuum heat treating of 0.040-inch-diameter sintered and wrought molybdenum wires influence the ultimate ductility. Rapid heating rates resulted in higher ductility than did slow heating rates.

Influence of Heat Treatment on the Ductile-Brittle Transition Temperature of Semikilled Steel Plate. pp. 323-329.

Structural steels become brittle when subjected to low temperatures or severe stresses. This article discusses how grain size influences the toughness of a typical steel.

Theory of a Thermomagnetic Oxygen-Measuring Instrument. (Zur Theorie der thermomagnetischen Sauerstoffmessgeräte) Helmar Krupp. *Zeitschrift fur angewandte Physik*, December, 1954, pp. 541-547.

The high paramagnetic susceptibility of oxygen in comparison with other gases is the basis of a magnetic method for the quantitative determination of oxygen in gases. The author presents a thorough mathematical analysis of the relations between individual factors of the device used in this method and indicates optimum structural details.

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**Members of the Battelle staff are authors of the recently published articles and books listed on this page. In most cases, reprints are available from the Battelle Publications Office, 505 King Avenue, Columbus 1, Ohio.*

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BATTELLE TECHNICAL REVIEW ABSTRACTS

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***Asterisks mark items that may be used in the Battelle Library only. None of the unbound materials listed below are available for interlibrary loan.**

AERONAUTICAL ENGINEERING

7441* Space Equivalent Conditions Within the Earth's Atmosphere. Physiological Aspects. (English.) H. Strughold. *Astronautica Acta*, v. 1, no. 1, 1955, p. 32-40.

Presently available environments are considered. Graphs. 25 ref.

7442 Acceleration of Slender Bodies of Revolution Through Sonic Velocity. J. D. Cole. *Journal of Applied Physics*, v. 26, Mar. 1955, p. 322-327.

Linearized theory of slender bodies in arbitrary motion at zero angle of attack. Graphs, diagrams. 5 ref.

7443* The Flow Due to Impulsive Motion of a Wedge and Its Similarity to the Diffraction of Shock Waves. (English.) Akira Sakurai. *Physical Society of Japan, Journal*, v. 10, no. 3, Mar. 1955, p. 221-228.

Analysis is performed to clarify the non-uniform region of the air flow caused by impulsive motion. Diagrams, graph. 5 ref.

7444 Boundary Layer Control. G. V. Lachmann. *Royal Aeronautical Society, Journal*, v. 59, Mar. 1955, p. 163-194; disc., p. 194-198.

Review of theory and possible applications. Graphs, diagrams, photographs, micrographs. 57 ref.

7445 The Compressible Laminar Boundary Layer With Heat Transfer and Arbitrary Pressure Gradient. Clarence B. Cohen and Eli Reshotko. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3326, Apr. 1955, 43 p. (TL570 Un3t)

Approximate method for calculation. Tables, graphs. 29 ref.

7446 Laminar Boundary Layer Behind Shock Advancing Into Stationary Fluid. Harold Mirels. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3401, Mar. 1955, 25 p. (TL570 Un3t)

Velocity and temperature profiles, recovery factors, and skin friction and heat-transfer coefficients are tabulated. Tables, graphs. 9 ref.

Books and Miscellaneous Publications

7447 A Selection of Graphs for Use in Calculations of Compressible Airflow. L. Rosenhead, chairman. 115 p. 1954. Oxford University Press, London. (QA930 G79.1sg)

Characteristics of isentropic flows and normal and oblique shock waves.

7448 Linearized Theory of Steady High-Speed Flow. G. N. Ward. Cambridge Monographs on Mechanics and Applied Mathematics. 243 p. 1955. Cambridge University Press, New York. (TL573 W21c)

Equations of motion; subsonic and supersonic theory.

7449 Modern Air Logistics. 50 p. 1955. Air Force Association, Washington, D. C. (Ul68 Ai71m)

Discusses need for cooperation between government and industry in problems of air transportation.

AGRICULTURE

7450* The Effect of 2,4,5-Trichlorophenoxyacetic Acid on Cell and Nuclear Size and Endopolyploidy in Parenchyma of Apricot Fruits. Muriel V. Bradley and Julian C. Crane. *American Journal of Botany*, v. 42, Mar. 1955, p. 273-281.

Includes graph, micrographs, table. 35 ref.

7451 The Effect of Ionizing Radiation on Plant Growth. Karl Sax. *American Journal of Botany*, v. 42, Apr. 1955, p. 360-364.

X-rays seemed to stimulate the growth of lettuce and cabbage, but more critical tests showed no significant effect of the irradiation. Tables. 17 ref.

7452 The Inhibition of Abnormal Cell Proliferation With Antiauxin. B. Esther Struckmeyer and R. H. Roberts. *American Journal of Botany*, v. 42, Apr. 1955, p. 401-405.

Role of antiauxin in inhibiting plant cell disturbances. Photographs, micrographs, table. 9 ref.

7453* Mode of Insecticidal Action Studied With Labelled Systems. Phosphorylated Compounds in the Muscle of the Adult Housefly, Musca Domestica, L. F. P. W. Winteringham, Patricia M. Bridges, and G. C. Hellyer. *Biochemical Journal*, v. 59, Jan. 1955, p. 13-21.

Disturbances in phosphorylated intermediates evaluated. Tables, diagram, chromatogram, micrographs. 30 ref.

7454* Inactivation of the Catalase of Wheat Seedlings by Heavy Metals Salts and the Reactivation of the Artificial Zymogens Which are Formed. **Inaktivatsiia katalazy prorostkov pshenitsy soliami tiazhelykh metallov i reaktivatsiia obrazuiushchikhsia iskusstvennykh zimogenov.** (Russian.) L. I. Vigorov. *Biokhimiia*, v. 20, no. 1, Jan.-Feb. 1955, p. 3-15.

Activation by Cu- and Pb-nitrates. Reactivation of Cu- and Pb-"zymogens" by neutral or weak alkaline salts, phosphate buffer, or organic acids. Graphs, tables. 31 ref.

7455 Pesticides in the Field. W. A. Stearman. *Canadian Chemical Processing*, v. 39, Feb. 1955, p. 38, 40, 42, 44.

Problems in effective and economical use. Photographs.

7456* Effects of Benzenehexachloride on Soil Microorganisms. IV. Benzenehexachloride-Resistant Bacteria From Virgin Soils. P. H. H. Gray and C. G. Rogers. *Canadian Journal of Microbiology*, v. 1, Apr. 1955, p. 312-318.

Results of tests to ascertain whether the addition of BHC to agar medium would repress the formation of colonies, or would favor the development of particular groups of bacteria. Tables. 5 ref.

7457 Synthesis of Plant-Growth Regulators. IV. Substituted α-2-Naphthyloxypropionic Acids. P. M. Pope and D. Woodcock. *Chemical Society, Journal*, 1955, Feb., p. 577-579.

8 ref.

7458 The Extraction of Organic Matter From Podzolic B Horizons With Organic Reagents. A. E. Martin and R. Reeve. *Chemistry & Industry*, 1955, no. 13, Mar. 26, p. 356.

Describes acetone fractionation and analysis of soil. 4 ref.

Agriculture

7459* **Research Trends.** K. Starr Chester. *Chemurgic Digest*, v. 14, Mar. 1955, p. 7.

Needs for introduction of new or different crops in various parts of the world.

7460* **The Cattail Potential.** Ernest Reed and L. C. Marsh. *Chemurgic Digest*, v. 14, Mar. 1955, p. 9, 18.

Factors favoring commercial growing of cattail for fiber and food production. Photographs.

7461* A New Preparation for Treating Seeds. **Novyi preparat dlia protravlivaniia semian.** (Russian.) M. K. Firsova. *Dostizheniia Nauki i Peredovogo Opyta v Sel'skom Khoziaistve*, 1955, no. 2, Feb., p. 59-62.

Discusses effectiveness of tetramethylthiuram disulfide as compared with other fungicides, on germination of summer wheat. Tables.

7462 The Automatic Recording of Animal Behaviour in the Field. R. J. Canaway, W. F. Raymond, and J. C. Tayler. *Electronic Engineering*, v. 27, Mar. 1955, p. 102-105.

Describes a simple apparatus for the continuous non-subjective recording of animal movement under field conditions. Photographs, diagrams, circuit diagram. 6 ref.

7463* **Ammonia Liquor as a Nitrogenous Fertilizer.** Henry Tod and Kenneth Simpson. *Gas Journal*, v. 281, Mar. 30, 1955, p. 857-858.

Evaluates utilization of gasworks 'ammonia liquor' byproduct directly on growing crops. Tables.

7464* **Phytotoxicity of Hydrocarbons.** (English.) H. B. Currier and S. A. Peoples. *Hilgardia*, v. 23, Nov. 1954, p. 155-173.

Toxicities of benzene, cyclohexene, cyclohexane, *n*-hexane, and hexene-1 under various conditions. Tables, photographs. 36 ref.

7465* **The Effects of Disease on Insect Populations.** (English.) Edward A. Steinhaus. *Hilgardia*, v. 23, Dec. 1954, p. 197-261.

Review. Graphs. 143 ref.

7466 Review of Current Knowledge of Toxicity of Cholinesterase Inhibitor Insecticides. L. W. Hazleton. *Journal of Agricultural and Food Chemistry*, v. 3, Apr. 1955, p. 312-319.

All these insecticides may be safely used if adequate precautions are taken to avoid acute exposure. Under use conditions residue hazard appears to be negligible. 80 ref.

7467 The Role of Arboricides in Bush and Forest Eradication. J. D. Fryer. *Journal of the Science of Food and Agriculture*, v. 6, Feb. 1955, p. 73-78.

Review of literature. Experimental work in Africa. 50 ref.

7468 The Value of Sewage-Sludge Ashes as Phosphorus Fertilizers. G. W. Cooke and H. L. Nixon. *Journal of the Science of Food and Agriculture*, v. 6, Feb. 1955, p. 79-82.

Pot experiments to determine the fertilizer value of P in ashes prepared from three sewage sludges. Tables. 5 ref.

7469 The Fate of γ-Benzene Hexachloride in Normal and Resistant Houseflies. I. F. R. Bradbury and H. Standen. *Journal of the Science of Food and Agriculture*, v. 6, Feb. 1955, p. 90-99.

Studies using C-14 tracers. Tables. 15 ref.

7470* Effectiveness of Azotobacter Grown on Sapropel. **Effektivnost' azotobacterina, prigotovlennogo na sapropele.** (Russian.) N. A. Polianskii. *Mikrobiologiia*, v. 24, no. 1, Jan. Feb. 1955, p. 57-61.

Includes tables. 1 ref.

7471* Occurrence of Actinomyces-Antagonists in the Soils of the Kola Peninsula. **Rasprostranenie aktinomitsetov- antagonistov v pochvakh Kol'skogo Poluostrova.** (Russian.) A. I. Koreniako, A. G. Kuchaeva, and I. E. Mishustina. *Mikrobiologiia*, v. 24, no. 1, Jan.-Feb. 1955, p. 62-66.

Factors contributing to their occurrence. Tables. 7 ref.

7472* Actinomyces-Antagonists in the Soils of the Middle Reaches of the Lena River. **Aktinomitsety-antagonisty pochv srednego techeniia R. Leny.** (Russian.) N. S. Egorov and A. N. Polin. *Mikrobiologiia*, v. 24, no. 1, Jan.-Feb. 1955, p. 67-72.

Methods for isolating from the soil; types of actinomycets occurring and antibacterial action. Tables. 7 ref.

7473* Fertilizers and the Microflora of Soil. **Udobrenie i mikroflora pochvy.** (Russian.) Iu. M. Vozniakovskaia. *Mikrobiologiia*, v. 24, no. 1, Jan.-Feb. 1955, p. 99-102.

Effect of fertilizers on no. of microorganisms in the rhizosphere soil. Table. 15 ref.

7474 Infection of Wheat by Loose Smut, *Ustilago tritici* (Pers.) Rostr. C. C. V. Batts. *Nature*, v. 175, Mar. 12, 1955, p. 467-468.

Shows route of entry is probably through ovary wall. Micrographs. 7 ref.

7475* Contribution to the Knowledge of Growth Substances of Peat. **Beitrag zur Kennzeichnung von Wirkstoffen des Torfes.** (German.) J. Niggemann. *Naturwissenschaften*, v. 42, no. 4, Feb. 1955, p. 98.

Growth accelerators and inhibitors in peat. Table. 7 ref.

7476 Extending Onion Storage Life by Gamma Irradiation. S. L. Dallyn, R. L. Sawyer, and A. H. Sparrow. *Nucleonics*, v. 13, Apr. 1955, p. 48-49.

Irradiation inhibits the sprout growth of onions. Photograph, table. 4 ref.

7477* **Some Viruses of the Field Tomato in Ontario.** Blair H. MacNeill. *Plant Disease Reporter*, v. 39, Mar. 1955, p. 191-193.

Determination of viruses obtained from 200 samples. Table. 4 ref.

7478* **Progress Report on the Use of Streptomycin for the Control of Bacterial Spot of Tomatoes Under Field Conditions on South Florida Sandy Soils.** Donald M. Coe. *Plant Disease Reporter*, v. 39, Mar. 1955, p. 215-219.

Includes table. 3 ref.

7479* **1,2-Dibromo-3-Chloropropane—A New Nematocide.** C. W. McBeth and Glenn B. Bergeson. *Plant Disease Reporter*, v. 39, Mar. 1955, p. 223-225.

Greenhouse and field tests of nematocidal effectiveness. Table. 6 ref.

7480* Peculiarities of Nitrogenous Feeding on the Basis of the Evolution of Nitrogen. **Osobennosti azotnogo pitaniia rastenii na osnove evoliutsii azota.** (Russian.) Iu. A. Usmanov. *Zemledelie*, v. 3, no. 2, Feb. 1955, p. 72-77.

Effect of N fertilizers, compared with other types, on wheat, barley, and corn crops. Table. 1 ref.

Books and Miscellaneous Publications

7481 Commercial Fertilizers. Gilbeart H. Collings. 5th Ed. 617 p. 1955. McGraw-Hill, New York. (S633 C69c5)

Deals with the development, manufacture, and use of commercial fertilizers.

7482 Chemistry of the Pesticides. Donald E. H. Frear. 3rd Ed. 469 p. 1955. D. Van Nostrand Co., New York. (TP980 F87c3)

Detailed up-to-date information on the chemistry, properties, production, applications, and reactions of present day insecticides, fungicides, herbicides, and rodenticides.

7483 The Production and Agricultural Value of Silicophosphate Fertilizers. 283 p. Great Britain Ministry of Supply. (TP963 G79.7p)

Constitution of British fertilizers. Laboratory and field experiments in culture of various vegetable crops.

7484 Reviews of Research on Problems of Utilization of Saline Water. 96 p. 1954. UNESCO, Paris. (QH88 Un2u)

Reviews plant growth and agriculture in saline waters; demineralization of sea water.

See also:
7538 (casein production)
7601 (herbicide residue analysis)
7608 (molybdenum in soils)
8530 (fibers from corn protein)

BIOCHEMICAL AND BIOPHYSICAL RESEARCH

7485 Enzymatic Hydrolysis of Xylan. Roy L. Whistler and Edward Masak, Jr. *American Chemical Society, Journal*, v. 77, Mar. 5, 1955, p. 1241-1243.

Enzyme from *Aspergillus foetidus* is chromatographed into two different fractions. Tables. 21 ref.

7486 The Particle Weight, Hydration and Shape of the T_2 Bacteriophage of *Escherichia coli*. Neil W. Taylor, Herman T. Epstein, and Max A. Lauffer. *American Chemical Society, Journal*, v. 77, Mar. 5, 1955, p. 1270-1273.

Examined by Svedberg's techniques. Table, graphs. 11 ref.

7487* Nutrition and Growth of Several Blue-Green Algae. William A. Kratz and Jack Myers. *American Journal of Botany*, v. 42, Mar. 1955, p. 282-287.

Includes tables, graphs. 21 ref.

7488* Observations on Photosynthesis and Related Systems. I. Influence of Anaerobiosis on Photosynthetic Rates During Continuous Irradiation. F. L. Allen. *Archives of Biochemistry and Biophysics*, v. 55, Mar. 1955, p. 38-53.

Includes diagram, table, graphs. 36 ref.

7489* The Biosynthesis of Vitamin B_{12}-Like Compounds. J. E. Ford, E. S. Holdsworth, and S. K. Kon. *Biochemical Journal*, v. 59, Jan. 1955, p. 86-93.

Cultured in *Escherichia coli* 113-3. Tables, chromatograms. 25 ref.

7490* Toxicity of Aromatic Acids to the Larvae of the Mosquito *Aedes aegypti* L. and the Counteracting Influence of Amino Acids. J. E. Casida. *Biochemical Journal*, v. 59, Feb. 1955, p. 216-221.

Studies with 50 aromatic and 30 amino acids reported. Tables. 39 ref.

7491* Complex-Formation Between Polypeptides and Metals. I. Application of Various Experimental Methods to the Glycine-Copper System. II. The Reaction Between Cupric Ions and Some Dipeptides. III. The Reaction Between Cupric Ions and Diglycylglycine. Hazel Dobbie, W. O. Kermack, and H. Lees. *Biochemical Journal*, v. 59, Feb. 1955, p. 240-264.

Includes tables, graphs. 26 ref.

7492* Qualitative Studies of Soil Microorganisms. XII. Characteristics of Vitamin-B_{12}-Requiring Bacteria. A. G. Lochhead and Margaret O. Burton. *Canadian Journal of Microbiology*, v. 1, Apr. 1955, p. 319-330.

Studies of growth essentials. Tables. 16 ref.

7493 Studies in the Vitamin D. Field. I. Synthesis of Trienes Containing the Tachysterol Chromophore. II. The Condensation of Acetylmethyl*cyclo*hexenes With *cyclo*-Hexanone. E. A. Braude and O. H. Wheeler. *Chemical Society, Journal*, 1955, Feb., p. 320-334.

102 ref.

7494 The Resistance of *Bact. lactis aerogenes (Aerobacter aerogenes)* to 8-Hydroxyquinoline. D. E. F. Hughes and Cyril Hinshelwood. *Chemical Society, Journal*, 1955, Feb., p. 347-349.

Describes adaptation of resistance. Tables, graph. 2 ref.

7495 Bacteriological Problems in Translating From Small Equipment to the Industrial Scale. W. B. Emery. *Chemistry & Industry*, 1955, no. 10, Mar. 5, p. 236-240.

Problems in scaling up fermentation processes. 9 ref.

7496* Alcoholic Fermentation in the Presence of Some Combinations of Metals of the Platinum Family. **Fermentation alcoolique en présence de quelques combinaisons de métaux de la famille du platine.** (French.) Fernande Larèze. *Comptes rendus*, v. 240, no. 8, Feb. 21, 1955, p. 919-921.

Observations show that combinations of Ir, Pt, Rh, and Ru are relatively non-inhibitors of alcoholic fermentation. Table. 1 ref.

7497 Pore-Size Distribution in Collagen and Leather by the Porosimeter Method. Robert R. Stromberg. *Journal of Research, National Bureau of Standards*, v. 54, Feb. 1955, p. 73-81.

Determination of pores in the range 100 to 20000-A. in radius. Diagrams, tables, graphs. 19 ref.

7498 Inhibitory Substances of Bacterial and Other Origins in Milk and Milk Products. N. J. Berridge. *Journal of the Science of Food and Agriculture*, v. 6, Feb. 1955, p. 65-72.

Study of factors which control microflora in milk. Tables, graph, diagrams. 31 ref.

7499* Marine Mycology. Helen S. Vishniac. *New York Academy of Sciences, Transactions*, v. 17, Feb. 1955, p. 352-360.

Utilization of nutrients by marine fungi. Table, graphs. 18 ref.

7500* Concepts and Problems Concerning the Electron Microscopy of Plant Viruses. Mark A. Stahmann and Paul Kaesberg. *Phytopathology*, v. 45, Apr. 1955, p. 187-195.

Includes diagram, micrographs. 28 ref.

7501 Molting of Roaches Without Prothoracic Glands. L. E. Chadwick. *Science*, v. 121, Mar. 25, 1955, p. 435.

Presence of glands is immaterial. Table. 4 ref.

Books and Miscellaneous Publications

7502 Method of Biochemical Analysis. David Glick, editor, v. II. 470 p. 1955. Interscience Publishers, New York. (QP519 M56)

Analysis of steroids, lipids, vitamins, enzymes, and serums.

7503 The Chemistry of Lipids of Biochemical Significance. J. A. Lovern. Methuen's Monographs on Biochemical Subjects. 132 p. 1955. John Wiley & Sons, New York. (QP751 L94c)

Preparation, structure, and analysis. Studies of lipids in tissues.

7504 Outlines of Enzyme Chemistry. J. B. Neilands and Paul K. Stumpf. 315 p. 1955. John Wiley & Sons, New York. (QP601 N31o)

Designed as a general subject survey for readers versed in chemistry; not an "enzyme catalog".

7505 Antimetabolites and Cancer. Cornelius P. Rhoads, editor. 312 p. 1955. American Association for the Advancement of Science, Washington, D. C. (QP801.A65 An87)

Eighteen papers on the biochemical studies of metabolism in tumor cells.

7506* The Manual of Antibiotics. Henry Welch, editor. 87 p. 1954. Medical Encyclopedia, New York. (RM267 M31)

List of commercially available antibiotic preparations, giving generic name, composition, and manufacturers' trade name.

7507 Symposium: Some Biological Effects of Radiation From Nuclear Detonations. 111 p. 1954. Science Press, Lancaster, Penna. (QH505 Sy68)

Eight papers on production of mutations and other effects in plant and animal life.

See also:
7631 (steroidal sapogenins)
7652 (cortisone synthesis)

CERAMICS AND CONCRETE

7508 Ultrasonic Attenuation Studies in Biased $BaTiO_3$ Ceramics. T. F. Hueter and D. P. Neuhaus. *Acoustical Society of America, Journal*, v. 27, Mar. 1955, p. 292-296.

The attenuation of pulsed 10-Mc. ultrasound in barium titanate ceramics is studied as a function of temperature and applied field. Graphs, diagrams. 11 ref.

Ceramics and Concrete

7509 Metal-Ceramic Interactions. V. Note of Reactions of Metals With Titanium Carbide and Titanium Nitride. W. D. Kingery and F. A. Halden. *American Ceramic Society Bulletin*, v. 34, Apr. 1955, p. 117-119.

Interfaces and powder mixtures were studied microscopically and with X-ray techniques. Diagram, tables. 11 ref.

7510 Effects of Nuclear Reactor Exposure on Some Properties of Vitreous Silica and Quartz. W. Primak, L. H. Fuchs, and P. Day. *American Ceramic Society, Journal*, v. 38, Apr. 1955, p. 135-139.

Effects include decreases in density, refractive indices, rotatory power, and birefringence, disappearance of the α-β transition, and changes in the absorption spectrum. Graphs, X-ray diffraction patterns, table. 4 ref.

7511 Phase Equilibria in the System $BaTiO_3$-$CaTiO_3$. R. C. DeVries and R. Roy. *American Ceramic Society, Journal*, v. 38, Apr. 1955, p. 142-146.

Includes table, diagram, graph. 4 ref.

7512 Synthetic Mica Research in Japan. Tokiti Noda. *American Ceramic Society, Journal*, v. 38, Apr. 1955, p. 147-152.

Progress on mica synthesis and uses. Graphs, tables. 31 ref.

7513* An Interpretation of Some Published Researches on the Alkali-Aggregate Reactions. I. The Chemical Reactions and Mechanism of Expansion. T. C. Powers and H. H. Steinour. *American Concrete Institute, Journal*, v. 26, Feb. 1955, p. 497-516; *ACI Proceedings*, v. 51, 1955, p. 497-516.

Attempts to explain the nature of reactions responsible for expansion when concrete contains silica in a reactive form, and the mechanism of abnormal expansion. Diagrams, tables, graphs. 13 ref.

7514* Magnetite Iron Ore Concrete for Nuclear Shielding. J. O. Henrie. *American Concrete Institute, Journal*, v. 26, Feb. 1955, p. 541-550; *ACI Proceedings*, v. 51, 1955, p. 541-550.

Ore preparation; physical properties; costs and fabrication of shield for hot cell construction. Photographs, tables, graphs. 2 ref.

7515 Evaluation of Performance of Electric-Arc Furnace Refractories. M. P. Fedock. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint*, 1954, 4 p. (TN706 EL25p)

Effects of furnace size and melting practice on refractory consumption. Graphs.

7516* Study on Components of Gases in Glass. II. Effects of Conditions of Melting and Refining on Components of Gases in Glass. III. Components of Gases Present in Bubbles in Glass. (Japanese.) Tsuneo Okamura and Tadoru Uno. *Asahi Glass Company, Reports of the Research Laboratory*, v. 4, no. 1, 1954, p. 1-18.

Improved method for analysis of gases contained in glass. Evolution velocity of gases in Na_2O-CaO-MgO-SiO_2 glasses. Graphs, tables, micrographs. 14 ref.

7517* Measurement of Young's Moduli of Refractories by Sonic-Vibration Method. II. Young's Moduli of Silica Brick at High Temperatures. (Japanese.) Jōichirō Segawa, Kiyoshi Kaiden, and Shirō Suetoshi. *Asahi Glass Company, Reports of the Research Laboratory*, v. 4, no. 1, 1954, p. 30-41. Includes graphs, diagrams. 10 ref.

7518 Preliminary Report on Coated Lightweight Concrete Aggregate From Canadian Clays and Shales. VI. British Columbia. H. S. Wilson. *Canada, Department of Mines and Technical Surveys, Mines Branch Memorandum Series No.* 128, Oct. 1954, 42 p. (TN41 C16m)

Tests of potentialities of various sources of raw materials. Graphs, diagram, table, map. 13 ref.

7519 Ultrasonic Dispersion of Slips and Glazes. Thomas A. Dickinson. *Ceramic Age*, v. 65, sec. 1, Mar. 1955, p. 13-14, 27.

Theory; equipment; procedures. Diagrams, photographs. 5 ref.

7520 Magnetic Properties of Clay Ware Products. Horace Manley. *Ceramic Age*, v. 65, sec. 1, Mar. 1955, p. 28.

Nature of magnetic constituents in pottery and structural clay products. Table.

7521 Refractories in the Iron and Steel Industry. II. Alumino-Silicates: Corrosion Resistance. Helen Towers. *Iron & Steel*, v. 28, Mar. 1955, p. 101-105, 108.

Attack of refractories by various slags. Effects of permeability of linings and slag properties. 69 ref.

7522 High Temperature Heat Contents of Aluminates of Calcium and Magnesium. K. R. Bonnickson. *Journal of Physical Chemistry*, v. 59, Mar. 1955, p. 220-221.

Studies range from 298 to 1808 K. Tables, graph. 6 ref.

7523* A New Formula for Particle Size Distribution of Products Produced by Comminution. (English.) Jonas Svensson. *Kungl. Tekniska Högskolans Handlingar (Transactions of the Royal Institute of Technology, Stockholm, Sweden)*, 1955, no. 88, p. 1-53. (T4 K96t)

Develops a new equation based on earlier work by studying ball-milled samples of quartz and limestone. Tables, graphs. 23 ref.

7524 Progress Report on Cermets. Frank W. Glaser. *Metal Progress*, v. 67, Apr. 1955, p. 77-82, 138.

Properties and applications of Ni aluminides, TiC with metal binder, and borides of Cr-Mo. Micrograph, tables, graphs, photographs.

7525 The Calcium Silicate Hydrates. R. H. Bogue. *Portland Cement Association Fellowship, Paper No.* 69, Sept. 1954, 19 p. (TA439 P83p)

The hydration products of the Ca silicates are discussed from the points of view of phase equilibrium, thermo-analytical, X-ray diffraction, and electron-optical techniques in reference to the problems of their stoichiometry, structure, and morphology. Micrographs. 40 ref.

7526* Process for Determining Elastic Constants of Glass. Procédé de détermination des constantes élastiques du verre. (French.) Jacques Rabinovitch and Jean Marcatand. *Revue d'optique*, v. 34, no. 2, Feb. 1955, p. 103-105.

Method used to evaluate elastic coefficients of samples of glass. Diagrams.

7527* Silicone Films on Glass Surfaces. Silikonfilme auf Glasoberflächen. I. (German.) Hans Wessel. *Silikattechnik*, v. 6, no. 1, Jan. 1955, p. 3-9.

Lattice structures of glasses and silicones; bonding forces; application; effect of different organic groups on water-repelling properties, temperature resistance, and coefficient of friction. Diagrams, graphs, table. 11 ref.

7528* Effect of Slip Processing Methods on the Properties of Porcelain. Vliianie otdel'nykh metodov obrabotki massy na svoistva farfora. (Russian.) S. G. Tumanov and M. G. Kirillova. *Steklo i Keramika*, v. 12, no. 2, Feb. 1955, p. 23-26.

Mechanical properties of product, as affected by composition, heat treatment, and de-airing of slip. Tables.

7529* Raman Diffusion in Silicate Glasses. La diffusion raman dans les verres de silicates. (French.) L. Prod'homme. *Verres et réfractaires*, v. 8, no. 6, Nov.- Dec. 1954, p. 305-314; disc., p. 315.

By comparing Raman spectra of different glasses with vitreous silica it is possible to show the disturbing action of various oxides which effect the dislocation of the silica network. Diagram, table, spectrographs. 15 ref.

7530* Solubility in a $CaCO_3$-$MgCO_3$-H_2O System at Various Temperatures and Pressures of CO_2. Rastvorimost' v sisteme $CaCO_3$-$MgCO_3$-H_2O pri razlichnykh temperaturakh i davleniiakh CO_2. (Russian.) O. K. Ianat'eva. *Zhurnal Obshchei Khimii*, v. 25, no. 2, Feb. 1955, p. 234-237.

Experimental data on the action of water on dolomite and its significance in hydro-engineering construction. Table, graph. 5 ref.

7531* Electrical Conductivity of Solid Substances With Ionic-Atomic Valence. **Elektroprovodnost' tverdykh ionno-atomnovalentnykh veshchestv. I-II.** Experimental-Theoretical Expressions for Molar Electrical Conductivity of Borosilicates. **Eksperimental'no-teoreticheskie vyrazheniia dlia moliarnoi elektroprovodnosti borosilikatov.** (Russian.) R. L. Miuller. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 2, Feb. 1955, p. 236-255.

Includes tables, diagrams. 24 ref.

Books and Miscellaneous Publications

7532 The Chemistry of Portland Cement. Robert Herman Bogue. 2nd Ed. 793 p. 1955. Reinhold, New York. (TP883 B63c2)

Constitution of various cements; manufacturing procedures; cement utilization.

See also:
8096 (electric furnace refractories)
8447 (use of ceramic elements)

CHEMICAL ENGINEERING

7533 Some Further Data on Pressure System Centrifugal Refining. Frank E. Sullivan. *American Oil Chemists' Society, Journal*, v. 32, Mar. 1955, p. 121-123.

New refining systems for crude vegetable oils. Diagrams, tables. 3 ref.

7534 A Bench-Scale Method for Evaluating the Processing Characteristics of Oilseeds for Filtration-Extraction. A. V. Graci, Jr., J. J. Spadaro, M. L. Paredes, E. L. D'Aquin, and H. L. E. Vix. *American Oil Chemists' Society, Journal*, v. 32, Mar. 1955, p. 129-131.

Includes diagram, table. 8 ref.

7535* Control Processes Continually With the Infra-Red Analyzer. Paul A. Wilks, Jr. *Automatic Control*, v. 2, Mar. 1955, p. 10-12.

Applications of infra-red analyzers in petroleum refineries. Photographs.

7536* General Remarks on Fluidization. **Généralités sur la fluidisation.** (French.) René Fort. *Bulletin de la société chimique de France*, 1955, no. 3, Mar., p. 448-452.

Use in chemical engineering for heat transmission and mol. diffusion. Graphs, diagrams.

7537* Applications of Fluidization: Oxidation and Reduction in Mineral Chemistry. **Applications de la fluidisation: oxydation et réduction en chimie minérale.** (French.) Marcel Prangé and Armand Ziegler. *Bulletin de la société chimique de France*, 1955, no. 3, Mar., p. 456-461.

Describes use of fluidization in the reduction, by H, of iron oxide fines resulting from the calcination of carbonates, and in the sulfating of Cu. Tables, graphs, diagram.

7538 A Canadian Chapter in the Story of Casein. *Canadian Chemical Processing*, v. 39, Feb. 1955, p. 29 + 4 pages.

Production innovations for high quality casein. Photograph. 4 ref.

7539 Fast Estimates of Fluidization Velocities. Jack Lowenstein. *Chemical Engineering*, v. 62, Apr. 1955, p. 189-190.

Presents graphic aids which eliminate calculation. Nomograph, graph. 2 ref.

7540 Take a Look at Electric Heaters. W. S. Eyth and Ronald L. Faber. *Chemical Engineering*, v. 62, Apr. 1955, p. 191-194.

Utilization of five types of electrical elements. Photographs, graph.

7541 Chemical Engineering Fundamentals. I. Interpretation of Kinetic Data. Thomas E. Corrigan. *Chemical Engineering*, v. 62, Apr. 1955, p. 199-204.

How to select the correct mechanism equation. Graphs. (To be continued.)

7542 Urea via the Pechiney Process. *Chemical Engineering*, v. 62, Apr. 1955, p. 320-323.

Pictured flowsheet of the Grace Chemical plant at Memphis. Photographs, flowsheet.

7543 Performance of Wet Dust Scrubbers. C. E. Lapple and H. J. Kamack. *Chemical Engineering Progress*, v. 51, Mar. 1955, p. 110-121.

Fundamental data; use in air pollution control. Tables, graphs, diagrams, photograph, micrograph. 4 ref.

7544 Factors Affecting Gas Recirculation and Particle Expansion in Spray Drying. J. A. Buckham and R. W. Moulton. *Chemical Engineering Progress*, v. 51, Mar. 1955, p. 126-133.

Studies a vertical cylindrical cocurrent-flow dryer with ammonium sulfate liquor. Table, graphs, diagram, photograph, micrographs. 17 ref.

7545 Relative Volatility of Binary Mixtures From a Fractionating Column at Finite Reflux. Arthur Rose and William R. Biles. *Chemical Engineering Progress*, v. 51, Mar. 1955, p. 138-140.

Based on establishment of pinch conditions. Tables, graphs. 6 ref.

7546 The Rotating-Disc Contactor—A New Tool for Liquid- Liquid Extraction. G. H. Reman and R. B. Olney. *Chemical Engineering Progress*, v. 51, Mar. 1955, p. 141-146.

Design and performance data. Tables, graphs, diagram, photographs. 2 ref.

7547 Calculation of Finside Coefficients in Longitudinal Finned-Tube Exchangers. Loyal Clarke and R. E. Winston. *Chemical Engineering Progress*, v. 51, Mar. 1955, p. 147-150.

Theory and application. Tables, graphs, photograph. 10 ref.

7548* Boiler Feedwater Treatment and Oxygen Scavengers. S. R. M. Ellis. *Chemical & Process Engineering*, v. 36, Mar. 1955, p. 79-82.

Prefers hydrazine to sodium sulfite as scavenger. Photograph. 13 ref.

7549 The Evolution of Hydroforming. J. Henry Rushton. *Chemistry in Canada*, v. 7, Mar. 1955, p. 31-35.

Includes flowsheets, graphs, tables. 54 ref.

7550 Chemical Engineering Considerations of Packed Tower Design. Max Leva. *Chemistry in Canada*, v. 7, Mar. 1955, p. 40-45.

Reviews tower packing history and enumerates desirable packing properties. Diagrams, graphs. 16 ref.

7551 Sulphur and Sulphuric Acid From Petroleum. F. E. Hixon. *Chemistry & Industry*, 1955, no. 13, Mar. 26, p. 332-340.

Production and utilization of H_2S and H_2SO_4. Tables, flowsheets, diagrams. 6 ref.

7552 Petrochemical Processes for Acetic Anhydride Manufacture. Peter W. Sherwood. *Industrial Chemist and Chemical Manufacturer*, v. 31, Mar. 1955, p. 115-123.

Production by the ethylene diacetate, acetaldehyde oxidation, and acetic acid cracking processes, and from acetone. Flowsheets, table.

7553 Latent Heats of Vaporization. Om. P. Kharbanda. *Industrial Chemist and Chemical Manufacturer*, v. 31, Mar. 1955, p. 124-127.

Determined by nomograms from critical temperature, pressure, and vapor pressure at temperature in question. 18 ref.

7554 Production of Coumarone Indene Resin. R. C. Peter. *Industrial Chemist and Chemical Manufacturer*, v. 31, Mar. 1955, p. 141-143.

Describes modern process using BF_3. Table, flowsheet.

7555 Rotary Air Dryer Operation. J. Robert Spraul. *Industrial and Engineering Chemistry*, v. 47, Mar. 1955, pt. 1, p. 368-374.

All equations used have only limited application. Tables, diagram. 10 ref.

Chemical Engineering

7556 Continuous Ion Exchange With an Endless Belt of Phosphorylated Cotton. C. H. Muendel and W. A. Selke. *Industrial and Engineering Chemistry*, v. 47, Mar. 1955, pt. 1, p. 374-379.

System was selective for Cu in a Cu-Na system; acid media hydrolize the cotton. Table, graphs, diagram. 14 ref.

7557 Heat Transfer Design Data. Inclined Falling Films. Leo Garwin and Emerson W. Kelly, Jr. *Industrial and Engineering Chemistry*, v. 47, Mar. 1955, pt. 1, p. 392-395.

Water studied at angles of 9° to 90° and rates of 1850 to 10,100 lb. per (hr.) (ft. of breadth). Photograph, diagram, graphs. 15 ref.

7558 Analogs as Aids in Process Studies. *Industrial and Engineering Chemistry*, v. 47, Mar. 1955, pt. 1, p. 396-421.

A symposium of four papers on application of electrical, pneumatic, and hydraulic analogs and the signal flow diagram. Tables, graphs, photographs, diagrams. 53 ref.

7559 Azeotropes of 2-Butoxyethanol With Alkyl Benzenes. William F. Kieffer and Richard A. Holroyd. *Industrial and Engineering Chemistry*, v. 47, Mar. 1955, pt. 1, p. 457-458.

Butyl Cellosolve as an azeotrope former is studied in seven systems. Table, graph. 7 ref.

7560 Pure Amines for the Flotation of Silica From Rougher Phosphate Concentrate. Thomas H. Lentz, David E. Terry, and Harold Wittcoff. *Industrial and Engineering Chemistry*, v. 47, Mar. 1955, pt. 1, p. 468-471.

Pure unsaturated C_{18} amines are best; others are rated. Tables, graphs. 5 ref.

7561 Petroleum Residua as Sources of Lubricating Oil. Neal W. Furby. *Industrial and Engineering Chemistry*, v. 47, Mar. 1955, pt. 1, p. 480-486.

For low-cost estimation of lubricant content of new crudes; based on Conradson carbon, % S, % wax, and viscosity gravity constant. Tables, graphs. 5 ref.

7562 Detergency Studies With Sulfated Tallow Alcohols. Lloyd Osipow, Dorothea Marra, Cornelia T. Snell, and Foster Dee Snell. *Industrial and Engineering Chemistry*, v. 47, Mar. 1955, pt. 1, p. 492-496.

Tallow syndets are competitive with petroleum-based products. Tables. 1 ref.

7563 Lactic Acid Purification by Extraction. Robert B. Weiser and Christie J. Geankoplis. *Industrial and Engineering Chemistry*, v. 47, Apr. 1955, p. 858-863.

The system, water-lactic acid-isoamyl alcohol with steam distillation for solvent recovery, justifies larger scale study. Tables, graphs, phase diagram, flowsheet. 21 ref.

7564 The Platforming Process. Gustav Egloff. *Institute of Petroleum, Journal*, v. 41, Mar. 1955, p. 69-77; disc., p. 77-79.

Production of aromatic hydrocarbons for chemical manufacture, and the production of H for upgrading charging stocks and for other purposes, such as the manufacture of ammonia. Tables, diagrams, graphs.

7565 Correlation Between Equilibrium Flash Vaporization and ASTM Distillation Data of Petroleum Mixtures. J. C. Chu and E. J. Staffel. *Institute of Petroleum, Journal*, v. 41, Mar. 1955, p. 92-99.

Investigation of existing correlations and development of a new one to be used in petroleum refining engineering. Tables, graphs. 37 ref.

7566 Collagen Pores Determined by Electron Microscopy. Max Swerdlow and Robert R. Stromberg. *Journal of Research, National Bureau of Standards*, v. 54, Feb. 1955, p. 83-90.

The existence and morphology of pores of the order of 150 A., in radius, within collagen fibrils is delineated. Micrographs. 15 ref.

7567* Regulation of the Dispersiveness of Liquid Aerosols Obtained by the Condensation Method. **Regulirovanie dispersnosti zhidkikh aerozolei, poluchaemykh kondensatsionnym metodom.** (Russian.) A. G. Amelin and M. I. Beliakov. *Kolloidnyi Zhurnal*, v. 17, no. 1, Jan.-Feb. 1955, p. 10-17.

Vaporizer and nozzle described. Degree of glycerine aerosol dispersion in relation to nozzle diameter. Temperature and pressure of vapor. Graphs, diagrams, table. 5 ref.

7568 Using Tracers in Refinery Control. D. E. Hull. *Nucleonics*, v. 13, Apr. 1955, p. 18-21.

Determination of flow rate, volume, flow pattern, efficiency of separation and mixing, and leakage. Diagrams, graph. 9 ref.

7569 Catalysis in Petroleum Refining. *Oil and Gas Journal*, v. 53, Mar. 21, 1955, p. 139-198.

Processes, applications, and outlook. Diagrams, tables, graph, flowsheets, photographs. 58 ref.

7570 Polyvinyl Acetate Synthesised in Great Britain. *Paint Manufacture*, v. 25, Mar. 1955, p. 111-113.

Plant at Chester-le-Street, Durham, uses acetic acid and C_2H_2. Photographs, flowsheet.

7571 Process Unit Turnarounds. *Petroleum Refiner*, v. 34, Mar. 1955, p. 129-185.

Petroleum refining scheduling and inspection procedures for most efficient and economical use of equipment. Tables, graphs, photographs, diagrams.

7572* Heat Transfer in Foam Apparatus. **O teploneredache v pennom apparate.** (Russian.) I. P. Mukhlenov and E. S. Tumarkina. *Zhurnal Prikladnoi Khimii*, v. 28, no. 2, Feb. 1955, p. 135-144.

Three-shelf foam apparatus is described with activity taking place between air and water. Relation of heat transfer coefficient to rate of air or gas flow is computed. Tables, graphs, diagram. 11 ref.

7573* Rate of Absorption of Nitrogen Oxides by $Ca(OH)_2$ Solutions in High-Speed Mechanical Absorbers. **Skorost' absorbtsii okislov azota rastvorami $Ca(OH)_2$ v mekhanicheskikh absorberakh s bol'shim chislom oborotov.** (Russian.) S. N. Ganz and S. B. Kravchinskaia. *Zhurnal Prikladnoi Khimii*, v. 28, no. 2, Feb. 1955, p. 145-155.

Structural pecularities; advantages. Diagram, graphs, tables. 6 ref.

Books and Miscellaneous Publications

7574 The Practice of Modern Perfumery. Paul Jellinek. (Translated and revised from the German by A. J. Krajkeman.) 219 p. 1954. Interscience Publishers, New York. (TP983 J39pt)

Principles; perfumery of toilet soaps and cosmetics.

7575 The Extraction of Iron, Cobalt, and Nickel Sulfates. Carl Solomon Schlea. 159 p. 1955. Ohio State University, Columbus. (TP156.E8 Sch36e)

Liquid-liquid extraction with a variety of organic solvents at 25 and 70 C showed no system with commercial promise.

7576 Symposium on Odor. ASTM Special Technical Publication No. 164. 81 p. 1954. American Society for Testing Materials, Philadelphia. (TD887 Am35s)

Six papers covering definitions, tests, pollution, and control measures.

See also:

7484 (sea water purification)
7497 (pore size distribution in leather)
7660 (production of itaconic acid)
7972 (shale oil processing)
8040 (mechanical seals)
8391 (reactor fuel recovery)

CHEMISTRY—ANALYTICAL AND INORGANIC

7577 Characterization of Organic Substances by Differential Thermal Analysis. General Experimental Technique. Hirokazu Morita and H. M. Rice. *Analytical Chemistry*, v. 27, Mar. 1955, p. 336-339.

Shows that thermograms are unique for many compounds. Tables, thermograms. 11 ref.

7578 Differential Measurements of Reflectance. C. A. Lermond and L. B. Rogers. *Analytical Chemistry*, v. 27, Mar. 1955, p. 340-346.

Applicable to chromatography, paints, dyes, etc. Tables, graphs. 17 ref.

7579 A Spectrochemical Procedure of General Applicability. Edwin K. Jaycox. *Analytical Chemistry*, v. 27, Mar. 1955, p. 347-350.

Based on use of GeO_2 filler with CuO and graphite buffers, in both samples and standards. Tables. 13 ref.

7580 Ultraviolet Spectrophotometric Determination of Styrene and Phthalate and Fumarate Esters in Polyester Resins. R. C. Hirt, R. G. Schmitt, and R. W. Stafford. *Analytical Chemistry*, v. 27, Mar. 1955, p. 354-356.

Accomplished without prior chemical treatment or separation. Tables. 12 ref.

7581 Simultaneous Spectrophotometric Determination of Calcium and Magnesium. Allen Young, Thomas R. Sweet, and Bertsil B. Baker. *Analytical Chemistry*, v. 27, Mar. 1955, p. 356-359.

Depends on 360 mμ absorption at pH 9.5 and 11.7. Table, graphs. 3 ref.

7582 Chromatography of Organic Acids With Nonesterifying Solvents. Ralph W. Scott. *Analytical Chemistry*, v. 27, Mar. 1955, p. 367-369.

Ketones plus halogenated hydrocarbons used instead of alcohols. Table, chromatogram. 9 ref.

7583 Determination of Carbon Monoxide in Air Pollution Studies. Martin Shepherd, Shuford Schuhmann, and Marthada V. Kilday. *Analytical Chemistry*, v. 27, Mar. 1955, p. 380-383.

Colorimetric indicating gel used to determine amounts of 0.1 p.p.m. Diagram, tables. 2 ref.

7584 Kjeldahl Method With Sealed Tube Digestion. Factors Influencing Ammonia Decomposition. Benjamin W. Grunbaum, Paul L. Kirk, LeRoy G. Green, and Charles W. Koch. *Analytical Chemistry*, v. 27, Mar. 1955, p. 384-388.

Measures to control loss of NH_3. Tables, graphs. 4 ref.

7585 Determination of Hydroxy and Amino Compounds by a Chlorine-36—Isotope Dilution Method. Poul Sorensen. *Analytical Chemistry*, v. 27, Mar. 1955, p. 388-390.

Compound is converted to a Cl-containing derivative. Tables. 5 ref.

7586 Determination of Combined Acetic Acid Content of Cellulose Acetate. Gravimetric Method. Giuseppe Garetto and Alfredo Ruffoni. *Analytical Chemistry*, v. 27, Mar. 1955, p. 400-401.

Method based on wt. of cellulose regenerated from completely saponified ester. Table. 6 ref.

7587 Statistical Comparison of Three Methods for Determining Organic Peroxides. Constantine Ricciuti, J. E. Coleman, and C. O. Willits. *Analytical Chemistry*, v. 27, Mar. 1955, p. 405-407.

Polarographic, Wheeler iodide, and $SnCl_2$ methods are compared. Tables. 10 ref.

7588 Purification, Purity, and Freezing Points of Sixty-Four American Petroleum Institute Standard and Research Hydrocarbons. Anton J. Streiff, Aura R. Hulme, Phyllis A. Cowie, Ned C. Krouskop, and Frederick D. Rossini. *Analytical Chemistry*, v. 27, Mar. 1955, p. 411-415.

Includes graphs. 10 ref.

7589 Phenol-Indo-2,6-Dichlorophenol as a Spray Reagent. J. Barnabas and G. V. Joshi. *Analytical Chemistry*, v. 27, Mar. 1955, p. 443-444.

Dye selectively differentiates several organic acids in chromatography. Chromatogram. 3 ref.

7590 Apparatus for the Pyrohydrolytic Determination of Fluoride and Other Halides. C. D. Susano, J. C. White, and J. E. Lee, Jr. *Analytical Chemistry*, v. 27, Mar. 1955, p. 453-454.

Durable apparatus made of Ni and stainless steel. Photographs.

7591 Determination of Phosphate in Perchloric and Sulfuric Acid Solutions of Uranium Phosphates. Ion Exchange Separation and Amperometric Determination. E. G. Cogbill, J. C. White, and C. D. Susano. *Analytical Chemistry*, v. 27, Mar. 1955, p. 455-457.

Uranium is removed on Dowex 50 resin. Tables. 4 ref.

7592 Microchemical Detection of Fluorides. Sodium Fluosilicate Crystal Test. N. I. Goldstone. *Analytical Chemistry*, v. 27, Mar. 1955, p. 464-466.

Detailed procedure given for a variety of substances. Micrograph. 15 ref.

7593 High Frequency Induction Furnace in the Determination of Radiocarbon. A. M. Gaudin and Horacio E. Bergna. *Analytical Chemistry*, v. 27, Mar. 1955, p. 467-468.

Fast and reliable method of forming $C^{14}O_2$. Table, diagrams. 8 ref.

7594* The Microdetermination of Iodine by the Catalytic Method. **Étude du microdosage de l'iode par la méthode catalytique. I.** Titration of Iodine. **Titrage de l'iode.** (French.) F. Lachiver. *Annales de Chimie (Paris)*, v. 10, Jan.-Feb. 1955, p. 92-134.

Includes diagram, tables, graphs. 50 ref. (To be continued.)

7595* Applications of X-Ray Spectrography in the Mining Industry. R. J. Traill. *Canadian Mining Journal*, v. 76, Mar. 1955, p. 55-58.

Instrumentation, theory, methods, and advantages of the process for the quantitative and qualitative analysis of metallic constituents in mill products and ore samples. Tables, graphs, diagram. 8 ref.

7596 Quantitative Analysis of Mixtures of Sodium, Potassium, Magnesium, and Calcium by Paper Chromatography. D. R. Tristram and C. S. G. Phillips. *Chemical Society, Journal*, 1955, Feb., p. 580-581.

Suitable for 100 μg. to 10 mg. of salts. Graph.

7597* Study of the Infra-Red Spectra of Compressed Hydrogen Chloride and Hydrogen Gas Mixtures and Appearance of a Combination Frequency Between HCl and H_2. **Étude du spectre infrarouge des mélanges de gaz chlorhydrique et d'hydrogène comprimés et apparition d'une fréquence de combinaison entre ClH et H_2.** (French.) Roger Coulon, Jean Robin, and Boris Vodar. *Comptes rendus*, v. 240, no. 9, Feb. 28, 1955, p. 956-958.

Includes graphs. 6 ref.

7598* New Method of Gravimetric Determination of Tungsten. Infra-Red Absorption Spectra of Tungstates Precipitated at Different pH Values. **Nouvelle méthode de dosage gravimétrique du tungstène. Spectres d'absorption infrarouge des tungstates précipités à différents pH.** (French.) Thérèse Dupuis. *Comptes rendus*, v. 240, no. 9, Feb. 28, 1955, p. 978-980.

2 ref.

7599* Semiquantitative Spectral Analysis in Mineralogical and Geochemical Investigations. **O polukolichestvennom spektral'nom analize pri mineralogicheskikh i geokhimicheskikh issledovaniiakh.** (Russian.) L. N. Indichenko. *Doklady Akademii Nauk SSSR*, v. 100, no. 4, Feb. 1, 1955, p. 775-778.

Spectral lines of As and Bi. Sensitivity of Ge lines. Tables, graph. 6 ref.

7600* Vacuum Differential Thermal Analysis of Coal. Lewis H. King and Walter L. Whitehead. *Economic Geology*, v. 50, Jan.-Feb. 1955, p. 22-41.

Establishes a correlation between the fixed C content and exothermic peak temperatures using vitrains from within a group of high-volatile bituminous A coals. Photographs, graphs, tables, diagrams. 10 ref.

7601* Chromotropic Acid Method for Determining 2,4-D Residues in Rinses. (English.) Louis C. Erickson and B. L. Brannaman. *Hilgardia*, v. 23, Dec. 1954, p. 175-184.

Tests for removal of herbicides from spray equipment. Graphs, tables. 13 ref.

Chemistry—Analytical and Inorganic

7602 Analysis for Industry. A. M. G. Macdonald. *Industrial Chemist and Chemical Manufacturer*, v. 31, Mar. 1955, p. 144-145.

Notes on coal and coke analysis. 21 ref.

7603 The Chromatographic Analysis of Hydrocarbon Mixtures. B. W. Bradford, D. Harvey, and D. E. Chalkley. *Institute of Petroleum, Journal*, v. 41, Mar. 1955, p. 80-88; disc., p. 89-91.

Includes tables, diagrams, photographs, graphs. 20 ref.

7604 The Solubility of Oxygen in Pure Water and Sea-Water. G. A. Truesdale, A. L. Downing, and G. F. Lowden. *Journal of Applied Chemistry*, v. 5, Feb. 1955, p. 53-62.

Determinations between 2 and 40 C using a modification of the Winkler titration technique. Tables, graphs, diagram. 22 ref.

7605 Reactive Methylene Groups. III. The Ehrlich-Sachs Reaction. A. McGookin. *Journal of Applied Chemistry*, v. 5, Feb. 1955, p. 65-66.

The Ehrlich-Sachs reaction generally results in the production of a mixture of azomethine(anil), nitrone, and azoxy-compound. Method is described whereby the azomethine is the sole product. 7 ref.

7606 Properties of Sodium Carbonate-Sodium Bicarbonate Solutions. S. G. Bedekar. *Journal of Applied Chemistry*, v. 5, Feb. 1955, p. 72-75.

Effect of variations in surface tension on variations in absorption coefficients. Graphs. 16 ref.

7607 Reaction Between Chlorine and Hydrogen Sulphide Over Alumina Catalyst. M. H. Khundkar and Md. Rakibuddowla. *Journal of Applied Chemistry*, v. 5, Feb. 1955, p. 75-81.

Studies to ascertain the feasibility of producing elementary S by employing this reaction. Tables, graphs, diagram. 14 ref.

7608 A Colorimetric Method for the Determination of Molybdenum in Soils. C. H. Williams. *Journal of the Science of Food and Agriculture*, v. 6, Feb. 1955, p. 104-110.

Includes tables. 7 ref.

7609* Determination of Thiosulfate and Sulfite in Electrolytic Copper-Cyanide Baths. **Tioszulfát és szulfit meghatározása rézcianidos galvánfürdőben.** (Hungarian.) Gyula Straub and A. Sándor Kiss. *Magyar Kémiai Folyóirat*, v. 61, no. 2, Feb. 1955, p. 43-45.

Includes tables, graph. 15 ref.

7610* Colorimetric Determination of Small Quantities of Titanium^{IV} in the Presence of Fe^{III}. **Kismennyiségű titán(IV) kolorimetriás meghatározása nagymennyiségű vas(III) mellett.** (Hungarian.) Pál Szarvas and Béla Csiszár. *Magyar Kémiai Folyóirat*, v. 61, no. 2, Feb. 1955, p. 50-54.

Includes graphs. 9 ref.

7611* Lead Analysis According to Isotope-Dilution Method With RaD as Carrier. **Bleianalyse nach der Isotopenverdünnungs-methode mit RaD als Träger.** (German.) H. v. Buttlar. *Naturwissenschaften*, v. 42, no. 4, Feb. 1955, p. 90-91.

Includes table, Fabry-Perot recording. 5 ref.

7612* Titration of Phenol Polycondensation Products With the Aid of Turbidity Measurements. **Titration von Phenolpolykondensationsprodukten mit Hilfe von Trübungsmessungen.** (German.) Josef Čepelák. *Plaste und Kautschuk*, v. 2, no .2, Feb. 1955, p. 34-38.

Includes graphs. 35 ref.

7613* Determination of Mg in Spheroidal Cast Iron. **Stanovení hořčíku v tvárné litině.** (Czech.) Zdeněk Večeřa and Boleslav Bieber. *Slévárenství*, v. 3, no. 1; *Práce Československého Výzkumu Slévárenského*, v. 2, no. 15, p. 107-112.

Evaluation of various techniques. Tables, graphs. 21 ref.

7614* Versatile Analytical Absorption Column. **Vielseitig verwendbare analytische Absorptionskolonne.** (German.) D. Hausding. *Zeitschrift für analytische Chemie*, v. 145, no. 1, 1955, p. 1-5.

Design and applications. Diagrams. 6 ref.

7615* A Mercurimetric Method of Determining Thiourea. **Eine mercurimetrische Bestimmungsmethode von Thioharnstoff.** (German.) H. L. Kies. *Zeitschrift für analytische Chemie*, v. 145, no. 1, 1955, p. 5-9.

Includes graphs, table. 10 ref.

7616* Separation of Uranium From Trivalent Iron by Means of Ion Exchange. **Trennung des Urans von dreiwertigem Eisen mittels Ionenaustausches.** (German.) Robert Klement. *Zeitschrift für analytische Chemie*, v. 145, no. 1, 1955, p. 9-12.

Includes diagram, table. 4 ref.

Books and Miscellaneous Publications

7617 Paper Chromatography. Friedrich Cramer. (Translated from the German by Leighton Richards. 2nd Rev. Ed. 124 p. 1954. St. Martin's Press, New York. (QD271 C84p2t)

Principles, techniques, and applications.

7618 Mass Spectroscopy. Mark G. Inghram and Richard J. Hayden. Nuclear Science Series Report No. 14, 51 p. 1954. National Academy of Sciences—National Research Council, Washington, D. C. (QC451 In4h)

Theory, equipment, and operation of ionic mass spectroscopes.

7619 Fluorine Chemistry. J. H. Simons, editor. v. II. 565 p. 1954. Academic Press, New York. (QD181.F1 S57f)

Preparation and reactions of inorganic and organic fluorides. Analytical procedures.

7620 Fritz Ephraim; Inorganic Chemistry. P. C. L. Thorne and E. R. Roberts. 6th Rev. Ed. 956 p. 1954. Interscience Publishers, New York. (QD151 Ep38i6)

The new and slightly enlarged edition of this well-known text.

7621 Proceedings of the First International Polarographic Congress in Prague. v. II-III. 774 p. 1951. Přírodovědecké Vydavateistvi, Prague. (QD115 In7p)

Part II is a bibliography of polarographic publications from 1922 to 1950. Part III consists of papers in a number of Western languages and covering various phases of polarography.

See also:

7458 (soil analysis)
7502 (biochemical analysis)
7561 (analysis of petroleum residuum)
7575 (analytical methods)
7639 (analysis of fats)
7642 (analysis of fatty acids)
8000 (electrophoresis)
8002 (microanalysis)
8015 (gas analysis)
8405 (X-ray analysis of chemicals)

CHEMISTRY—ORGANIC

7622 The Preparation of Geminally Substituted 4-Bromobutylamines. I. 4-Bromobutylamine and 4-Bromo-1,1-Dimethylbutylamine. II. 4-Bromo-2,2-Dialkyl- and Diarylbutylamines. III. 4-Bromo-3,3-Dimethylbutylamine. Ronald F. Brown and Norman M. van Gulick. *American Chemical Society, Journal*, v. 77, Mar. 5, 1955, p. 1079-1092.

Includes tables. 70 ref.

7623 Mechanism of Anion Exchange of Triphenylmethyl Chloride in Benzene Solution. C. Gardner Swain and Maurice M. Kreevoy. *American Chemical Society, Journal*, v. 77, Mar. 5, 1955, p. 1122-1128.

First-, second-, and third-order kinetics followed at 50 C. Tables. 30 ref.

7624 Pyrolysis of Esters. III. Synthesis of 2-Vinylbutadiene. William J. Bailey and James Economy. *American Chemical Society, Journal*, v. 77, Mar. 5, 1955, p. 1133-1136.

In 40% yield from aconitic ester in three steps.

7625 Allylic Chlorides. XXII. The 1,3-Dichloro-2-Butenes. Lewis F. Hatch and Robert H. Perry, Jr. *American Chemical Society, Journal*, v. 77, Mar. 5, 1955, p. 1136-1138.

Geometrical configurations verified by synthesis and reactions. Tables. 17 ref.

7626 Elimination Reactions in Cyclic Systems. I. *cis* Eliminations in the Cyclohexane and Cyclopentane Series. II. *cis* Eliminations Promoted by the Sulfonate Group. F. G. Bordwell, R. J. Kern, and Marvin L. Peterson. *American Chemical Society, Journal,* v. 77, Mar. 5, 1955, p. 1141-1148.

Includes tables. 26 ref.

7627 The Synthesis of Certain Organophosphorus Compounds Containing the Trichloromethyl Group. Kenneth C. Kennard and Cliff S. Hamilton. *American Chemical Society, Journal,* v. 77, Mar. 5, 1955, p. 1156-1159.

Reactions with trichloromethylphosphonic dichloride. Tables. 12 ref.

7628 12-Alkyloctahydrophenanthrenes Related to Dehydroabietic Acid. William E. Parham, Edward L. Wheeler, and R. M. Dodson. *American Chemical Society, Journal,* v. 77, Mar. 5, 1955, p. 1166-1169.

Synthesis. 8 ref.

7629 Heterocyclic Vinyl Ethers. VIII. The Acid-Catalysed Reaction of α-Haloacetals With Mercaptans. IX. Substitution Reactions of *cis*- and *trans*-Bis-(Phenylmercapto) -Ethylene. William E. Parham, Jack Heberling, and Hans Wynberg. *American Chemical Society, Journal,* v. 77, Mar. 5, 1955, p. 1169-1177.

31 ref.

7630 Macro Rings. VIII. Aromatic Substitution of the [6.6] Paracyclophane. IX. Transannular Deactivating Influence in the Aromatic Substitution of [4.4] Paracyclophane. Donald J. Cram, Jared Abell, and R. W. Kierstead. *American Chemical Society, Journal,* v. 77, Mar. 5, 1955, p. 1179-1190.

Includes table, ultra-violet spectra. 28 ref.

7631 Steroidal Sapogenins. XVII. Stereochemistry of the Spiroketal Side Chain. XVIII. Partial Hydrolysis of Steroidal Saponins of *Yucca schidigera.* Monroe E. Wall, Samuel Serota, C. Roland Eddy, Merle M. Krider, and Janet R. Branaman. *American Chemical Society, Journal,* v. 77, Mar. 5, 1955, p. 1230-1241.

Includes tables, graph, chromatogram, infra-red spectra. 51 ref.

7632 The Piperidine-Catalyzed Reaction of Triphenylsilane With Some Hydroxy Compounds. Henry Gilman, G. E. Dunn, Howard Hartzfeld, and A. G. Smith. *American Chemical Society, Journal,* v. 77, Mar. 5, 1955, p. 1287-1288.

Principally an alcoholysis reaction suitable for some alkoxysilanes. Table. 9 ref.

7633 Reaction of Grignard Reagents With Alkoxysilanes at Elevated Temperatures. E. T. McBee, C. W. Roberts, G. F. Judd, and T. S. Chao. *American Chemical Society, Journal,* v. 77, Mar. 5, 1955, p. 1292-1293.

Fluorine containing silanes synthesized. 5 ref.

7634 Hydrogen Isotope Effects in the Alkaline Cleavage of Triorganosilanes. Louis Kaplan and K. E. Wilzbach. *American Chemical Society, Journal,* v. 77, Mar. 5, 1955, p. 1297-1302.

Hydrolysis studied by substituting D^2 or T^3 for H^1. Tables. 31 ref.

7635 The Reaction of Organotin Halides With Diazomethane. Dietmar Seyferth and Eugene G. Rochow. *American Chemical Society, Journal,* v. 77, Mar. 5, 1955, p. 1302-1304.

Synthesis of 14 compounds of the type R_3SnCH_2X reported. Table. 12 ref.

7636 Some Sulfur Compounds as Polymerization Sensitizers. R. J. Kern. *American Chemical Society, Journal,* v. 77, Mar. 5, 1955, p. 1382-1383.

Seven S compounds studied with six vinyl-type monomers by thermal and photo-activation. Table. 2 ref.

7637 Reactions of Fatty Materials With Oxygen. XVII. Some Observations on the Secondary Products of Autoxidation of Methyl Oleate. Joseph E. Coleman, H. B. Knight, and Daniel Swern. *American Oil Chemists' Society, Journal,* v. 32, Mar. 1955, p. 135-137.

Includes table. 19 ref.

7638 Synthetic Detergents From Animal Fats. IV. Sodium 9,10-Dichlorooctadecyl Sulfates. J. K. Weil, A. J. Stirton, and E. W. Maurer. *American Oil Chemists' Society, Journal,* v. 32, Mar. 1955, p. 148-151.

Includes tables, graph. 8 ref.

7639 Application of Ultraviolet Spectrophotometry to the Analysis of Fats and Derivatives. S. F. Herb. *American Oil Chemists' Society, Journal,* v. 32, Mar. 1955, p. 153-158.

Includes graphs, tables. 56 ref.

7640 Comparative Antioxidant Potency of 2,4,5-Trihydroxyphenones. M. B. Knowles, Alan Bell, Clarence E. Tholstrup, and Herman S. Pridgen. *American Oil Chemists' Society, Journal,* v. 32, Mar. 1955, p. 158-160.

Test data for protection of lard, paraffin wax, and mineral oils. Tables, graphs.

7641 The Metallic Pelargonates: Their Properties and Applications. Martin L. Stumpf. *American Paint Journal,* v. 39, Apr. 11, 1955, p. 22 + 9 pages.

Tabulates physical properties for 24 soaps. 6 ref.

7642* The Estimation of Unsaturated Fatty Acids by Reversed-Phase Partition Chromatography. W. Mary L. Crombie, R. Comber, and S. G. Boatman. *Biochemical Journal,* v. 59, Feb. 1955, p. 309-316.

Estimation of inseparable saturates and unsaturates made by second chromatogram. Tables, graphs. 31 ref.

7643* Hydrolysis of Soaps: Laurates of the Alkali Family. **Hydrolyse des savons; les laurates de la famille des alcalins.** (French.) P. A. Laurent and A. J. Boyer. *Bulletin de la société chimique de France,* 1955, no. 3, Mar., p. 334-338.

Method of preparing carbonate-free solutions of RbOH and CsOH. Alkali laurates prepared and degree of hydrolysis determined at 25 and 50 C. Diagram, graphs, tables. 11 ref.

7644* Long-Chain Aliphatic Compounds. **Les composés aliphatiques à longue chaîne. I.** Synthesis Methods. **Méthodes de synthèse. II.** Intrinsic Viscosity and Transient Diffusion. **Viscosité intrinsèque et diffusion de translation.** (French.) Brini Mathilde. *Bulletin de la société chimique de France,* 1955, no. 3, Mar., p. 339-356.

Ketones and diketones prepared from nitriles using Grignard synthesis. X-ray and infra-red spectra of compounds having 36 to 44 C atoms. Tables, graphs, spectrograms. 92 ref.

7645* Sulfurization of Organic Compounds. **Sulfuration des composés organiques. VIII.** Dithiolethiones Derived From Methyl-2 and From Ethyl-2 Thiophene. **Dithiole-thiones dérivant du méthyl-2 et de l'éthyl-2 thiophène. IX.** Sulfurization of Alcohols and Acetylene Glycols. **Sulfuration d'alcools et de glycols acétyléniques.** (French.) Jean Teste and Noël Lozac'h. *Bulletin de la société chimique de France,* 1955, no. 3, Mar., p. 437-444.

Includes table. 26 ref.

7646* Thiocyanates of Aromatic Selenic Acids. **Thiocyanates d'acides sélénéniques aromatiques. VI.** Condensation With Analines. **Condensation avec des anilines.** (French.) Heinrich Rheinboldt and Madeleine Perrier. *Bulletin de la société chimique de France,* 1955, no. 3, Mar., p. 445-447.

Method for the preparation of asymmetrical aminoarylic selenides. 4 ref.

7647 Acrylonitrile and Derivatives—Building Blocks for Useful Products. *Chemical Processing,* v. 18, Apr. 1955, p. 48-49.

Five of over 200 acrylonitrile derivatives are discussed. Table.

7648 The Effect of Molecular Structure of Paraffins on Relative Chlorination Rates. G. Chambers and A. R. Ubbelohde. *Chemical Society, Journal,* 1955, Feb., p. 285-295.

Rate increases with chain length and decreases with branching. Tables, graphs. 25 ref.

7649 Polyazanaphthalenes. I. Some Derivatives of 1 : 4 : 5-Triazanaphthalene and Quinoxaline. C. L. Leese and H. N. Rydon. *Chemical Society, Journal,* 1955, Feb., p. 303-309.

Six different routes are described. Ultra-violet spectrum. 24 ref.

Chemistry—Organic

7650 Ferrocene Derivatives. II. Arylation. G. D. Broadhead and P. L. Pauson. *Chemical Society, Journal*, 1955, Feb., p. 367-370.

With diazonium salts or nitrosoacetanilide. 5 ref.

7651 Cyclic Diarsines. II. 1 : 4-Disubstituted Diethylenediarsines. III. Compounds Containing an Eight-Membered Diarsine Ring System. IV. Derivatives of 5 : 10-Dihydro-5 : 10-Dimethylarsanthren. Emrys R. H. Jones and Frederick G. Mann. *Chemical Society, Journal*, 1955, Feb., p. 401-422 + 1 plate.

Includes photographs, diagrams. 29 ref.

7652 Studies in the Synthesis of Cortisone. IX. Infra-Red Absorption of Polymorphic Steroids and Steroidal Sapogenins. X. Infra-Red Absorption of 23a- and 23b-Bromo-*iso*sapogenins. D. H. W. Dickson, J. E. Page, and D. Rogers. *Chemical Society, Journal*, 1955, Feb., p. 443-450.

Infra-red studies of steroids and sapogenins. Table, infra-red sepectra. 48 ref.

7653 Phenylpropiolic Acids. IV. The Self-Condensation of *o*- and *p*-Tolyl- and *o*-Chlorophenyl-Propiolic Acids. V. Self-Condensation of *m*-Alkoxy-and 3 : 4-Dialkoxy-Phenylpropiolic Acids. F. G. Baddar, Lanson S. Assal, Naguib A. Doss, H. A. Fahim, and M. A. Galaby. *Chemical Society, Journal*, 1955, Feb., p. 461-471.

38 ref.

7654 Intermolecular Complex Formation Between Iodine or Iodine Cyanide and Organic Molecules: Vibrational Spectra. D. L. Glusker and H. W. Thompson. *Chemical Society, Journal*, 1955, Feb., p. 471-479.

Effects on hydrocarbons, ketones, ethers, esters, ring ethers, pyridine, and picolines were studied. Tables, graph, infra-red spectra. 25 ref.

7655 Intensities of Vibration Bands. VI. Alkyl Esters. VII. The NH Group. VIII. The C≡N Group. R. A. Russell, H. W. Thompson, and M. W. Skinner. *Chemical Society, Journal*, 1955, Feb., p. 479-489.

Includes tables, graphs. 34 ref.

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7485 (hydrolysis of xylan)
7491 (complex biochemical reactions)
7503 (chemistry of lipids)
7504 (enzyme chemistry)
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Includes graphs, tables, diagrams. 21 ref.

Books and Miscellaneous Publications

7734 An Advanced Treatise on Physical Chemistry. v. V. Molecular Spectra and Structure; Dielectrics and Dipole Moments. J. R. Partington. 565 p. 1954. Longmans, Green and Co., New York. (QD453 P25a)

Theory; measurement of dielectric constants and dipole moments. Hyperelectrics.

See also:

7556 (continuous ion exchange)
7560 (use of amines as flotation agents)
7623 (anion exchange mechanism)
7634 (organosilane hydrolysis)
7654 (intermolecular action)
7655 (vibration bands of organic compounds)
7669 (molecular structure of organo-boron compounds)
8003 (ion exchange membranes)
8386 (neutron irradiation of triphenylarsine and triphenylstibine)
8487 (viscosity of high mol. wt. acids)

COATINGS

7735 A New Technique for Simultaneous Recording of Strains and Temperature in Enamel-Metal Systems. J. H. Lauchner, R. L. Cook, and A. I. Andrews. *American Ceramic Society Bulletin*, v. 34, Apr. 1955, p. 105-108.

Photoelectric cell incorporated as a means of measuring strains. Photographs, diagrams, graphs. 5 ref.

Coatings

7736 Bicycle Horns Coated by Vacuum Metalizing. *American Electroplaters' Society, Proceedings*, v. 41, 1954, p. 46-49. (TS670 Am35p)

Horns are finished by depositing a thin layer of Al under vacuum in the metalizer. Photographs.

7737 Electroless Nickel Plating Evaluated. Joseph Haas. *American Machinist*, v. 99, Mar. 14, 1955, p. 158-159.

Relative costs; advantages and disadvantages; bath compositions; applications of the process. Diagram.

7738 Pack Chromizing of Steel in a Compound Containing Chromium Sesquioxide. G. N. Dubinin. *Henry Brutcher Translation No.* 3466, 7 p. (From *Vestnik Mashinostroeniya*, v. 34, no. 11, 1954, p. 56-58.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 3758, v. 4, Mar. 1955.

7739 Recent Advances in Polymerization of Vegetable Oils. R. P. A. Sims. *Canadian Chemical Processing*, v. 39, Feb. 1955, p. 56, 58, 60, 62.

Uses; influences of unsaturation and temperature; processing methods. 26 ref.

7740 Porcelain Enameled Chalkboards. Paul A. Huppert. *Ceramic Age*, v. 65, sec. 1, Mar. 1955, p. 15-19.

Review of enamels, markets, and future possibilities. Photographs, tables. 40 ref.

7741 Alkyd Resin Nomograph. David Glaser. *Chemical Processing*, v. 18, Apr. 1955, p. 76, 78.

Factors for alkyds made from fatty acids, oils, and oil mixtures with various types of acids; including excess amounts of polyols. Tables.

7742 Sonic Method for Measuring Young's Modulus of Elasticity of Porcelain Enamel-Metal Composites. Robert E. Cowan. *Finish*, v. 12, Apr. 1955, p. 40-42, 62-64.

Equipment and test methods. Graphs, diagrams, photographs, table. 10 ref.

7743* Paint in Civil Engineering. I. Rolt Hammond. *Industrial Finishing (London)*, v. 8, Feb. 1955, p. 88-90, 91.

Surface preparation and selection of painting system to protect structures subjected to industrial and marine atmospheres. Photographs. 1 ref.

7744* Metallic Coatings on Non-Metallic Materials. I. Copper Films. *Industrial Finishing, (London)*, v. 8, Feb. 1955, p. 94, 96, 98-99.

Thermal and chemical deposition of Cu films on glass, ceramics, and plastics.

7745 Aluminum Coating Process Developed for Iron and Steel Wire. Bernard S. Westerman. *Iron and Steel Engineer*, v. 32, Mar. 1955, p. 126, 129-130.

Equipment and operating procedures. Diagram, photograph.

7746 The Chemistry of Styrenated Oils. J. B. Crofts. *Journal of Applied Chemistry*, v. 5, Feb. 1955, p. 88-100.

Studies of the interaction of styrene with the methyl esters of a number of drying-oil acids and with a dehydrated castor oil. Graphs, tables. 20 ref.

7747* A Method for the Preparation of Thin Films of Plutonium and Uranium. K. M. Glover and P. Borrell. *Journal of Nuclear Energy*, v. 1, Feb. 1955, p. 214-217.

Directions are given for making up the solutions for painting foils and coating the fission counters by a dipping process. Diagram. 2 ref.

7748* Experiment in the Use of "Asbovinyl" as a Corrosion-Resistant Material. **Opyt primeneniia asbovinila v kachestve antikorrozionnogo materiala.** (Russian.) A. I. Rychkov and I. Ia. Klinov. *Khimicheskaia Promyshlennost'*, 1954, no. 8, Dec., p. 492-493.

Protective coating identified as ethynol lac and ground asbestos for tanks and machine parts in sulfite cellulose plants, etc. Table.

7749* Influence of Structure and Composition of Cast Iron on the Quality of Enamel Coating. **Vliianie struktury i sostava chuguna na kachestvo emali.** (Russian.) I. N. Iukalov. *Liteinoe Proizvodstvo*, 1955, no. 2, Feb., p. 1-5.

Influence of Si, Mn, S, P, Cr, and Ni content; method of preparation of cast iron for enameling. Tables, micrographs, diagram. 15 ref.

7750* Chromium Diffusion Combats Corrosion, Heat, and Wear. Jack Hollingum. *Machinist (London)*, v. 99, Mar. 4, 1955, p. 361-367.

Coating methods; properties of coatings; applications. Photographs, micrographs, graphs.

7751 Electroplating for Shelf Life. J. B. Mohler. *Metal Finishing*, v. 53, Mar. 1955, p. 64-67, 72.

Types of coatings recommended for manufactured products depending on costs, thickness, appearance, environment, and life. Graphs, tables, photographs. 1 ref.

7752 Surface Treatment and Finishing of Light Metals. V. Chemical Conversion Coatings. S. Wernick and R. Pinner. *Metal Finishing*, v. 53, Mar. 1955, p. 73-77.

Chemical oxidation of tubes; chromate and phosphate processes; comparison of chemical oxide conversion coatings. Tables. 124 ref.

7753* Protection of Aluminum From Corrosion by Natural or Augmented Oxide Films: Recent Research. **Korrosionsschutz des Aluminiums durch natürliche oder verstärkte Oxydschichten: Neure Untersuchungen.** (German.) D. Altenpohl. *Metall*, v. 9, nos. 5-6, Mar. 1955, p. 164-171.

Effectiveness of natural and artificial films; relation between oxide films and Al potential. Tables, diagrams, graphs. 33 ref.

7754* Epoxy Coatings for Metal Decorating Finishes. M. A. Glaser, E. J. Bromstead, and G. L. Weaver. *Official Digest. Federation of Paint and Varnish Production Clubs*, v. 27, Jan. 1955, p. 3-9.

Characteristics and applications. Tables, photograph.

7755* A Review of Polyvinyl Acetate Emulsion Paints. George O. Morrison and Herbert Terry. *Official Digest. Federation of Paint and Varnish Production Clubs*, v. 27, Jan. 1955, p. 10-14.

Physical characteristics; compounding techniques; applications.

7756* The Effect of Various Extenders in Alkyd Flat Finishes. Franklin King, Jr. *Official Digest. Federation of Paint and Varnish Production Clubs*, v. 27, Jan. 1955, p. 15-23.

Includes tables, photograph, graphs. 3 ref.

7757* A Review of Surface Coating Developments. C. O. Schwahn. *Official Digest. Federation of Paint and Varnish Production Clubs*, v. 27, Feb. 1955, p. 63-82.

Progress report on important developments in protective coatings. Tables, photographs, graph.

7758* Half-Second Cellulose Acetate Butyrate. III. W. M. Gearhart and F. M. Ball. *Official Digest. Federation of Paint and Varnish Production Clubs*, v. 27, Feb. 1955, p. 83-92.

Plasticization of the cellulose ester with 38% butyryl and 12% acetyl content. Tables, graph.

7759* Glyceryl Monooleate in Alkyd Base Paints. W. J. Maxcy and J. P. Hardiman. *Official Digest. Federation of Paint and Varnish Production Clubs*, v. 27, Feb. 1955, p. 93-99.

Improvements in paint compositions by use of GMO. Tables, graph.

7760* Gelling Rates and Consistencies of Aluminum Di-2-Ethylhexanoate-Liquid Hydrocarbon Systems. F. Rodriguez and T. J. Walsh. *Official Digest. Federation of Paint and Varnish Production Clubs*, v. 27, Feb. 1955, p. 100-110.

Effects of solvent composition, soap concentration, and temperature. Graphs, tables. 30 ref.

7761* Polymer Distribution in Drying-Oil Modified Alkyd Resins. R. Wilson and A. H. Robson. *Official Digest. Federation of Paint and Varnish Production Clubs*, v. 27, Feb. 1955, p. 111-133.

Includes diagram, tables, graphs.

7762* **Vinyltoluene in Paints and Varnishes.** F. J. Buege, A. L. Cipriano, and R. B. Drubel. *Official Digest. Federation of Paint and Varnish Production Clubs*, v. 27, Mar. 1955, p. 148-162.

Vinyltoluene vehicles allow use of low cost drying oils and thinning with mineral spirits. Tables, graphs. 3 ref.

7763* **Some Practical Techniques for Recovering Free Paint Films From a Variety of Substrates.** L. R. LeBras and E. G. Bobalek. *Official Digest. Federation of Paint and Varnish Production Clubs*, v. 27, Mar. 1955, p. 163-166.

Preparation of films for electron microscopy. 5 ref.

7764* **Thermoplastic Resins in Surface Coatings.** L. E. Whitemore. *Official Digest. Federation of Paint and Varnish Production Clubs*, v. 27, Mar. 1955, p. 167-173.

Advantages and applications of various resins.

7765* **Surface Coatings Derived From "Epon" Resins.** O. L. Nikles. *Official Digest. Federation of Paint and Varnish Production Clubs*, v. 27, Mar. 1955, p. 185-193.

Versatility, chemical resistance, adhesiveness, and flexibility in unique combination leads to many applications.

7766 Emulsions. A. E. Alexander. *Oil & Colour Chemists' Association, Journal*, v. 38, Mar. 1955, p. 129-133.

Survey of surface-chemical study applying to paint technology. 11 ref.

7767* **Recent Progress in Lacquer Finishes.** O. A. Pickett. *Organic Finishing*, v. 16, Mar. 1955, p. 8-10.

Use of hot sprays; glossiness of lacquers; coating defects; aerosols; applications.

7768* **Wrinkle Finishes.** George A. Conrad. *Organic Finishing*, v. 16, Mar. 1955, p. 11-13, 21.

Types, uses, and application methods. Photographs.

7769* **Navy Finds Organic Finishes Aid in Protecting Selenium Rectifiers Against Mercurial Fungicides.** George W. Grupp. *Organic Finishing*, v. 16, Mar. 1955, p. 14-15.

Formulations of coatings which resisted penetration of Hg vapor. Table.

7770* **Paint Thinners From Petroleum. III. Naphthenes and Alkyl Naphthenes.** George W. Waters. *Paint Industry Magazine*, v. 70, Mar. 1955, p. 22-25, 47-49.

Chemical structure and properties. Tables, diagrams.

7771 Thixotropy and Paints. II. R. Quarendon. *Paint Manufacture*, v. 25, Mar. 1955, p. 106-108.

Particle size and shape effects; electrical measurements. 21 ref. (To be continued.)

7772 Vinyl Emulsion Paints. Theoretical and Practical Aspects. *Paint Manufacture*, v. 25, Mar. 1955, p. 109-110; disc., p. 110.

Compromises required in polyvinyl acetate.

7773 The Freeze-Thaw Stability of Polyvinyl Acetate Emulsion Paints. A. C. Fletcher and J. E. O. Mayne. *Paint Manufacture*, v. 25, Mar. 1955, p. 116-118, 124.

Different behaviors are discussed. Tables. 1 ref.

7774* **1954 Review of the Paint Industry.** Sam Ruggeri. *Paint and Varnish Production*, v. 45, Feb. 1955, pt. 2, p. 3-238.

Comprehensive review is divided into 51 chapters with subject, author, and company indexes.

7775* **Petroleum Thinners for the Paint Industry.** E. P. Rittershausen. *Paint and Varnish Production*, v. 45, Mar. 1955, p. 25-29.

Sources and important characteristics. Graphs, photographs, table.

7776* **Drying Oil Technology. III. Methods of Modifying Oils.** *Paint and Varnish Production*, v. 45, Mar. 1955, p. 34-35.

Ways of producing oils with desired characteristics.

7777* Modern Raw Materials for Lacquers. **Neuzeitliche Lackrohstoffe.** (German.) A. Foulon. *Plaste und Kautschuk*, v. 2, no. 1, Jan. 1955, p. 9-10.

Production of high-quality coatings with oxidized and cyclicized rubber and synthetic resins.

7778* **The Kreidl Process for Better Print Adhesion on Polyethylene.** Werner H. Kreidl and Frederick Hartmann. *Plastics Technology*, v. 1, Feb. 1955, p. 31-36.

Describes a flame treatment of the plastic surface. Tables, infra-red spectra, diagram, photograph.

7779 Evaluation of Etch Primers in Metal Coating Systems. *Products Finishing*, v. 19, Mar. 1955, p. 42 + 6 pages.

Surface preparation and conditions for effective use of pretreatment primers. Tables.

7780* Thermal-Diffusion Sulfiding of Steels. **Termodiffuzionnoe sul'fidirovanie stalei.** (Russian.) V. V. Gal'chenko. *Stanki i Instrument*, v. 26, no. 2, Feb. 1955, p. 17-19.

Sulfur diffusion coatings for steel rollers. Coating methods. Tables. 3 ref.

7781* Electrodes for Wear Resistant Deposits of Medium and High Hardness. **Elektrody dlia iznosoustoichivykh naplavok srednei i vysokoi tverdosti.** (Russian.) I. M. Vagapov. *Svarochnoe Proizvodstvo*, 1955, no. 2, Feb., p. 16-20.

Composition, structure, and optimum conditions of operation; physical properties of deposited metal. Tables, graphs, micrographs.

7782* Electric-Spark Protective Coating as a Method of Increasing Erosion Resistance of Thermohydraulic Power Installations. **Elektroiskrovoe pokrytie kak metod povysheniia eroziostoikosti teplogidroenergeticheskogo oborudovaniia.** (Russian.) A. D. Moiseev. *Vestnik Mashinostroeniia*, v. 35, no. 2, Feb. 1955, p. 55-57.

Types of alloy adaptable for and advantages of such treatment. Table, micrographs. 3 ref.

7783 Practical Hard Facing With Fused Self-Fluxing Metallized Coatings. Harvey S. Miller. *Welding Journal*, v. 34, Mar. 1955, p. 214-219.

"Spraywelding" technique involves four different stages; preparation of surface, spraying of deposit, fusing of deposit, and finishing. Photographs.

7784 Hot Dip Galvanizing Is a Science. II. Wallace G. Imhoff. *Wire and Wire Products*, v. 30, Mar. 1955, p. 295-297.

Effect of base-metal thickness and immersion time on coating thickness. Graphs, tables.

Books and Miscellaneous Publications

7785 Flow-Coating. E. A. Zahn. 295 p. 1954. Research Press, Dayton, Ohio. (TT305 Z13f)

A detailed account of specific problems, flow-coater design, finishing methods, and selection of paints and solvents for industrial finishing processes.

7786 Fire Retardant Paints. Advances in Chemistry Series, No. IX. 91 p. 1954. American Chemical Society, Washington, D. C. (TP936 Am35f)

Nine papers on types, formulation, and testing.

7787 The Measurement and Control of Industrial Paint Finishing Costs. 60 p. 1955. Imperial Chemical Industries, London. (TT305 M46)

Three papers on ways of reducing painting costs.

7788 Transactions of the Institute of Metal Finishing. v. XXIX. 364 p. 1952-1953. Institute of Metal Finishing, London. (TS670 E25j)

Twenty papers on cleaning, painting, and electroplating of metals.

See also:

7673 (properties and uses of modified castor oil coatings)
7943 (paint marketing)
8423 (paint research in the Netherlands)

CORROSION

7789* Activation Potentials of Iron-Chromium Alloys and Their Relationship to the Chemical Stability in Sulfuric Acid. **Die Aktivierungspotentiale von Eisen-Chrom-Legierungen und ihre Beziehungen zu der chemischen Beständigkeit in Schwefelsäure.** (German.) Hans-Joachim Rocha and Gustav Lennartz. *Archiv für das Eisenhüttenwesen*, v. 26, no. 2, Feb. 1955, p. 117-123.

Dependence of activation potential upon H-ion activity in sulfuric acid on Fe, Fe-Cr alloys, and Cr; passivity potential in sulfuric acid containing air. Graphs, table. 11 ref.

7790 Silicates as Corrosion Inhibitors in Synthetic Detergent Mixtures. Raymond Getty, Newton W. McCready, and William Stericker. *ASTM Bulletin*, 1955, no. 205, Apr., p. 50-59.

Use of Na silicates to reduce corrosion or tarnishing of metals by household detergent mixtures containing polyphosphates. Tables, photographs. 3 ref.

7791 Influence of Temperature and Time Upon Intergranular Corrosion of Welds in 18-8 Type Steel. N. Yu. Pal'chuck. *Henry Brutcher Translation No.* 3233, 19 p. (From *Avtomaticheskaya Svarka*, v. 6, no. 2, 1953, p. 3-14.) Henry Brutcher, Altadena, Calif.

Effects of C content, micro-structure, heat treatment time, and service temperature. Table, graphs, micrographs. 20 ref.

7792 Resistance to Intergranular Corrosion of Ferritic and Martensitic Stainless Chromium Steels. E. Houdremont and W. Tofaute. *Henry Brutcher Translation No.* 3443, 19 p. (Slightly abridged from *Stahl und Eisen*, v. 72, no. 10, 1952, p. 539-545.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 8802, v. 1, July, 1952.

7793 More Heat, Less Corrosion. *Chemical Engineering*, v. 62, Apr. 1955, p. 140, 142.

Volatile amines, in process steam, film over metal to control CO_2 and O attack. Photograph, table.

7794 Metal Corrosion and Protection. I. R. R. Rogers. *Chemistry in Canada*, v. 7, Mar. 1955, p. 37-38.

Corrosion mechanisms; comparison of corrosion rates of ferrous and non-ferrous metals. Tables, diagram. (To be continued.)

7795 Metallurgical Aspects of Dry Corrosion. L. B. Pfeil. *Chemistry & Industry*, 1955, no. 9, Feb. 26, p. 208-218.

Influence of composition, structure, and stresses on corrosion at elevated temperatures. Micrographs, photographs, table. 36 ref.

7796* Study by Electron Diffraction of the Oxidation of Tin Under Reduced Pressure. **Étude par diffraction électronique de l'oxydation de l'étain sous pression réduite.** (French.) Jean-Jacques Trillat, Léa Tertian, and Marie-Thérèse Plattard. *Comptes rendus*, v. 240, no. 5, Jan. 31, 1955, p. 526-528.

On heating pure Sn in a vacuum, it was possible to observe the fusion phenomenon and gradual transformation into SnO and SnO_2 oxides. Diffraction patterns. 2 ref.

7797* Process of Layer Formation in the Oxidation of Copper Under Low Pressure. **Sur un processus de germination dans l'oxydation du cuivre sous basse pression.** (French.) Finn Grønlund and Jacques Bénard. *Comptes rendus*, v. 240, no. 6, Feb. 7, 1955, p. 624-626.

Type and duration of reactions are investigated as functions of oxide formed during oxidation at low pressure. 2 ref.

7798 Case History of Failure of Marine Boiler Tubes by Stress Corrosion Cracking. R. D. Barer. *Corrosion*, v. 11, Apr. 1955, p. 18-24.

Results of examination of small samples cut from tubes. Mechanism of caustic cracking. Photographs, micrographs, graphs. 25 ref.

7799 Corrosion by Valve Packing. L. M. Rasmussen. *Corrosion*, v. 11, Apr. 1955, p. 25-30.

Observations of valve stem pitting during storage, after hydrostatic testing, indicate that the presence of soluble corrosive agents in the asbestos braid and graphite lubricant were responsible for the condition. Graphs, tables, diagram, photographs.

7800 Current Requirements for Cathodic Protection of Pipe Lines. Marshall E. Parker. *Corrosion*, v. 11, Apr. 1955, p. 52-57; disc., p. 57-58.

Review of definite methods; recommended procedures. Graphs. 1 ref.

7801 Some Corrosion Inhibitors—A Reference List. *Corrosion*, v. 11, Apr. 1955, p. 65-67.

Chemical and trade names, sources of supply, uses, material with which effective, and literature references for 68 inhibitors. Tables.

7802* Zero Charge Potential and Action Mechanism of Inhibitors of Acidic Corrosion of Iron. **Potentsial nulevogo zariada i mekhanizm deistviia ingibitorov kislotnoi korrozii zheleza.** (Russian.) E. O. Aiazian. *Doklady Akademii Nauk SSSR*, v. 100, no. 3, Jan. 21, 1955, p. 473-476.

Cathode polarization curves of Fe; relation of double layer capacity to the potential on Fe in sulfuric acid. Graphs, circuit diagram. 6 ref.

7803 Galvanic Corrosion Behavior of Titanium and Zirconium in Sulfuric Acid Solutions. David Schlain, Charles B. Kenahan, and Doris V. Steele. *Electrochemical Society, Journal*, v. 102, Mar. 1955, p. 102-109.

Studies of couples with Al alloys or 18-8 stainless steel. Diagram, tables, graphs. 8 ref.

7804 An Interpretation of the Significance of the Potentials of Passive Iron. M. J. Pryor. *Electrochemical Society, Journal*, v. 102, Apr. 1955, p. 163-169.

Explanation of effects of anodic corrosion inhibitors. Graphs. 23 ref.

7805 A Theoretical Basis for a New Method of Investigating Corrosion Inhibition. James G. Jewell. *Electrochemical Society, Journal*, v. 102, Apr. 1955, p. 198-205.

Basis for screening cathodic inhibitors by means of a function that may be determined by potential measurements when an external current is applied. Diagrams. 4 ref.

7806* Methods of Studying Corrosion Indicators. **K metodike issledovaniia indikatorov korrozii.** (Russian.) I. T. Deev and K. M. Morozova. *Elektricheskie Stantsii*, v. 26, no. 2, Feb. 1955, p. 12-14.

Use of indicator discs and the metallomicroscope micrometer. Corrosion product revealed by X-ray. Table, micrographs, photograph.

7807* For Cathodic Protection Power—Rectifiers or Sacrificial Anodes? Ray M. Wainwright. *Gas*, v. 31, Mar. 1955, p. 77 + 5 pages.

Application of cost concepts to help management select the system best suited to the conditions. Diagram, graph, table. 7 ref.

7808* Iron Bacteria in Gasholder Water. A. R. Mitchell. *Gas Journal*, v. 281, Mar. 30, 1955, p. 845-847.

Describes growth and control. Photographs.

7809* Study of the Corrosiveness of Sea Water. **Étude de la corrosivité de l'eau de mer.** (French.) A. Hache and P. Deschamps. *Institut de Recherches de la Sidérurgie, Publications*, ser. A. no. 90, Nov. 1954, 7 p. (Reprinted from *Corrosion et Anti-Corrosion*, v. 2 ,no. 4, July-Aug. 1954, p. 134-140.) (TS300 In7p)

Describes various factors that intervene in the corrosion of steel in comparison with the action of a NaCl solution. Tables, drawing, graphs. 6 ref.

7810 Effect of the Composition of Gas-Turbine Alloys on Resistance to Scaling and to Vanadium Pentoxide Attack. G. T. Harris, H. C. Child, and J. A. Kerr. *Iron and Steel Institute, Journal*, v. 179, Mar. 1955, p. 241-248.

Scale resistance in moving air of some typical gas-turbine alloys with and without coatings of V_2O_5 studied throughout their useful temperature range. Tables, graphs, diagrams. 5 ref.

7811 Geometric Factors in Electrical Measurements Relating to Corrosion and Its Prevention. W. J. Schwerdtfeger and Irving A. Denison. *Journal of Research, National Bureau of Standards*, v. 54, Feb. 1955, p. 61-71.

Discussion of the "electrical boundary" of a galvanic couple immersed in an aqueous medium, when corroding normally and also when corrosion is stopped by cathodic protection. Graphs, diagrams. 16 ref.

7812* Chemical Attack on Unprotected Aluminum and the Polishing Process. **Chemischer Angriff auf ungeschütztes Aluminium und Ablauf des Glänzvorganges.** (German.) H. Ginsberg and F. Baumann. *Metall*, v. 9, nos. 5-6, Mar. 1955, p. 160-163.

Effect of surface treatment on the behavior of Al in NaCl solution shows necessity of anodic treatment to protect surface. Graphs, photographs, micrographs. 6 ref.

7813 Symposium on Stress-Corrosion. W. D. Robertson. *Metal Progress*, v. 67, Apr. 1955, p. 140 + 4 pages.

A report of papers presented at the "Symposium on Stress-Corrosion Phenomena" held during the 106th Meeting of the Electrochemical Society, Oct. 3-7, 1954, at Boston, Mass.

7814 Effect of Temperature on Corrosion of Aluminum. Digest of "Influence of Temperature on the Rate of Corrosion of Aluminum and Several Aluminum Alloys", by G. V. Akimov and V. V. Romanov; *Doklady Akademii Nauk SSSR*, v. 91, 1953, p. 281-283.) *Metal Progress*, v. 67, Apr. 1955, p. 166, 168, 170, 172.

Results of tests in NaCl solutions. Graphs.

7815* **The Corrosivity of Fuming Nitric Acid.** John D. Clark and Michael A. Walsh. *New York Academy of Sciences, Transactions*, v. 17, Feb. 1955, p. 279-288.

Mechanism of corrosion of SS-347 in the red and white acids (97 to 98% acid) is evolved. Graphs. 2 ref.

7816 Cathodic Protection of Treating Equipment. W. C. Koger. *Petroleum Engineer (Management Ed.)*, v. 27, Mar. 1955, p. 92B-94B.

Operating life of emulsion reduction equipment can be substantially extended through the installation of Mg alloys. Graphs, photographs, diagram, tables.

7817* The Special Importance of Flow Rate of Sulfuric Acid Corrosion. **Strömungsgeschwindigkeit als besonderer Faktor bei der Schwefelsäure-Korrosion.** (German.) H. W. van der Hoeven. *Werkstoffe und Korrosion*, v. 6, no. 2, Feb. 1955, p. 57-62; disc., p. 62.

Effects of velocity and accumulation of corrosion products in the corrosive agent on Al-Ni bronze, and carbon steel. Photographs, diagrams, graphs, micrographs.

7818* Alternating Current Corrosion. **Beitrag zur Frage der Wechselstromkorrosion.** (German.) H. F. Schwenkhagen. *Werkstoffe und Korrosion*, v. 6, no. 2, Feb. 1955, p. 63-71; disc., p. 71.

Experimental data for d.c., a.c., and pulsating currents are used to account for corrosive effects of stray currents on underground transmission lines. Photographs, tables, graphs, circuit diagram. 7 ref.

7819* Influence of Flow Rate on Scale Formation and the Subsequent Corrosion in Hot Water Supply Devices. **Einfluss der Fliessgeschwindigkeit auf den Ausfall der Härtebildner und damit verbundene Korrosionen an Warmwassergeräten.** (German.) L. W. Haase. *Werkstoffe und Korrosion*, v. 6, no. 2, Feb. 1955, p. 81-84.

Effects of water composition, container material, and flow; benefits of a depolarizer. Diagrams, graph.

7820* Soil Corrosion of Aluminum. **Über die Bodenkorrosion des Aluminiums.** (German.) Tihomil Markovic. *Werkstoffe und Korrosion*, v. 6, no. 2, Feb. 1955, p. 84-86.

Effects of air and water in the soil on corrosion rates. Graphs. 6 ref.

7821 Stress Corrosion in High Tensile Wire. Walter O. Everling. *Wire and Wire Products*, v. 30, Mar. 1955, p. 316-319, 346-347.

Causes and correction for corrosion of wire for prestressed concrete. Graphs, diagrams, photographs.

See also:

8234 (corrosion resistance of Al-Si-Cu alloys)
8281 (corrosion resistance of high strength steels)

ELECTRICAL ENGINEERING

7822 A Transatlantic Telephone Cable. Mervin J. Kelly, Gordon Radley, G. W. Gilman, and R. J. Halsey. *Communication and Electronics*, 1955, no. 17, Mar., p. 124-136; disc., p. 136-139.

Routes; circuits; equipment. Maps, diagrams, photographs. 10 ref.

7823 Electrical Contact Materials. John D. Kleis. *Electrical Manufacturing*, v. 55, Apr. 1955, p. 102-107.

Mechanical and electrical properties of over 30 metals, alloys, and oxides related to performance. Tables, photographs.

7824* Protection of Electric Power Transmission Lines by Coordinating Struts and Some Results of Their Use. **Zashchita linii elektroperedachi koordiniruiushchimi podkosami i nekotorye itogi ikh ekspluatatsii.** (Russian.) V. V. Burgsdorf. *Elektricheskie Stantsii*, v. 26, no. 2, Feb. 1955, p. 38-42.

Damage and cut-out, during thunderstorms, reduced. Tables, diagrams.

7825* Two-Motor Asynchronous Drive of Industrial Units and Some of Its Possible Applications. **Dvukhdvigatel'nyi asinkhronnyi privod promyshlennykh agregatov i nekotorye ego vozmozhnosti.** (Russian.) S. Z. Barskii. *Energetik*, v. 3, no. 2, Feb. 1955, p. 7-11.

Describes operation and the advantages over single-motor drive. Graphs, circuit diagrams.

7826 Wind-Generated Electricity. *Engineering*, v. 179, Mar. 25, 1955, p. 371-374.

Design, control, and sites for a 100 ft. device, generating 100 kw. in a 30 m.p.h. wind. Diagram, photographs.

7827* Modernization of Electrical Plants by Dry Rectifiers. **Die Modernisierung elektrischer Anlagen durch Trockengleichrichter.** (German.) Walter Langhein. *Erdöl und Kohle*, v. 8, no. 2, Feb. 1955, p. 96-98.

Purpose and uses of rectifier systems in telecommunications and electrical engineering. Photographs. 4 ref.

7828 Audio-Frequency Power Measurements by Dynamometer Wattmeters. A. H. M. Arnold. *Institution of Electrical Engineers, Proceedings*, v. 102, pt. B, no. 2, Mar. 1955, p. 192-199; disc., p. 199-203.

Constructed for the measurement of power at frequencies up to about 20 kc. per sec. Circuit diagrams. 8 ref.

7829 The Precise Measurement of Capacitance. J. K. Webb and H. B. Wood. *Institution of Electrical Engineers, Proceedings*, v. 102, pt. C, no. 1, Mar. 1955, p. 3-12.

Designed for industrial application. Tables, circuit diagrams, graph. 21 ref.

7830 The A.C. Impedance of Plasma Discharges in Mercury Vapour. S. E. Yussuf and J. C. Prescott. *Institution of Electrical Engineers, Proceedings*, v. 102, pt. C, no. 1, Mar. 1955, p. 13-24.

Effect of the behavior of electron and thermal ionization on the impedance of the low- and high-pressure positive columns of a plasma discharge. Table, graphs, diagrams. 16 ref.

7831 The Design of Coils for the Production of High Magnetic Fields. A. N. Ince. *Institution of Electrical Engineers, Proceedings*, v. 102, pt. C, no. 1, Mar. 1955, p. 25-28.

Includes graphs. 6 ref.

7832 On the Analysis of Dielectric Relaxation Measurements. Robert H. Cole. *Journal of Chemical Physics*, v. 23, Mar. 1955, p. 493-499.

Convenient methods of analyzing dielectric dispersion and loss data satisfying the Debye equations. Graphs, tables. 21 ref.

Electrical Engineering

7833* The Production of Electrical Power From Separated Fission-Products. C. B. Amphlett. *Journal of Nuclear Energy*, v. 1, Feb. 1955, p. 173-180.

Different methods described for producing electrical power from radioactive nuclides. Diagram. 21 ref.

7834 Synthetic Methods for Interruption Tests on Circuit-Breakers. H. Bertil Thorén. *Kungl. Tekniska Högskolans Handlingar (Transactions of the Royal Institute of Technology, Stockholm, Sweden)*, 1955, no. 87, 60 p. (T4 K96t)

Includes graphs, photograph, table, circuit diagram. 73 ref.

7835* Differential-Amplifier Design. A. M. Andrew. *Wireless Engineer*, v. 32, Mar. 1955, p. 73-79.

Two types of amplifier stage are described which make possible good in-phase rejection without a balancing adjustment. Circuit diagrams. 3 ref.

7836* Conditions of Formation and Stability of Electrode Layers, in Dielectrics. **Ob usloviiakh obrazovaniia i ustoichivosti prielektrodnykh sloev v dielektrikakh.** (Russian.) Ia. N. Pershits. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki*, v. 28, no. 2, Feb. 1955, p. 181-190.

Heat treatment and action of electric field; variations of electrical conductivity caused by impurities and changes in properties of the layers .Graphs, table, diagram. 8 ref.

7837* Resistance of Metals to Large Current Densities. **Soprotivlenie metallov pri bol'shikh plotnostiakh toka.** (Russian.) V. V. Bondarenko, I. F. Kvartskhava, A. A. Pliutto, and A. A. Chernov. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki*, v. 28, no. 2, Feb. 1955, p. 191-198 + 1 plate.

Investigates resistance of Cu, Pt, Ag, Au, Al, W, and Fe to current density, and the degree to which Ohm's law is in evidence. Circuit diagram, graphs, micrographs. 7 ref.

Books and Miscellaneous Publications

7838 Magnetic Amplifiers. H. F. Storm. 545 p. 1955. John Wiley & Sons, New York. (TK7872.M3 St74m)

Explains the fundamentals underlying the operation and principal uses of the static (non-rotating) type amplifiers.

7839 Automatic Feedback Control System Synthesis. John G. Truxal. McGraw-Hill Electrical and Electronic Engineering Series. 675 p. 1955. McGraw-Hill, New York. (TJ213 T77a)

Design and synthesis of linear systems are covered in addition to an introduction to the analysis and design of non-linear systems.

7840 Kaiser Aluminum Electrical Conductor Technical Manual. 192 p. 1954. Kaiser Aluminum & Chemical Sales, Chicago. (TK3311.A6 K12k)

Reference book to meet the needs of users of aluminum conductor material; physical and mechanical properties.

See also:

7996 (electrical ignition equipment)
8187 (controls for annealing furnaces)

ELECTROCHEMISTRY AND ELECTROPROCESSES

7841 American Electroplaters' Society, Proceedings, (Annual Volume), v. 41, 1954. 288 p. American Electroplaters' Society, Newark. (TS670 Am35p)

Forty-five reports delivered at annual convention. Papers individually abstracted.

7842 Acceptance Sampling of Electroplated Articles. J. M. Cameron and Fielding Ogburn. *American Electroplaters' Society Proceedings*, v. 41, 1954, p. 19-22. (TS670 Am35p)

Basic ideas behind acceptance sampling. Graphs. 3 ref.

7843 The Determination of Boric Acid in Nickel Plating and Acid Zinc Plating Baths by Means of Cation Exchangers. Gunnar Gabrielson. *American Electroplaters' Society, Proceedings*, v. 41, 1954, p. 23-26. (TS670 Am35p)

Removing Ni ions, by percolating the solution through a layer of a H saturated cation exchanger. Tables. 5 ref.

7844 Radiometric Study of Supplementary Chromate Coatings for Zinc and Cadmium Plating. Stanley L. Eisler, Jodie Doss, and Mary Ann Henderson. *American Electroplaters' Society, Proceedings*, v. 41, 1954, p. 33-40. (TS670 Am35p)

Radiosulfur and radiochromium were used to determine amounts of sulfate and Cr contained in coatings produced from various supplementary dip solutions. Tables. 5 ref.

7845 The Polarographic Analysis of Nickel Plating Solutions. J. V. Petrocelli and G. Tatoian. *American Electroplaters' Society, Proceedings*, v. 41, 1954, p. 50-56. (TS670 Am35p)

General principles and techniques are outlined. Circuit diagram, graphs, photograph, tables. 9 ref.

7846 The Use of Unplasticized Polyvinyl Chloride in Electroplating Plants. Laurence N. Thomas. *American Electroplaters' Society, Proceedings*, v. 41, 1954, p. 57-62. (TS670 Am35p)

Uses and applications suggested to users of chemical processing and allied equipment. Photographs, tables.

7847 Current Density Distribution in Electroplating by Use of Models. Gilbert Ford Kinney and John V. Festa. *American Electroplaters' Society, Proceedings*, v. 41, 1954, p. 66-70. (TS670 Am35p)

Methods by which the current distribution can be controlled. Diagrams, graphs. 2 ref.

7848 Tentative Recommended Practice for Preparation of Copper and Copper-Base Alloys for Electroplating. *American Electroplaters' Society, Proceedings*, v. 41, 1954, p. 71-75. (TS670 Am35p)

Guide for platers in setting up a suitable cleaning and conditioning cycle preparatory to electroplating. 1 ref.

7849 Metal Reflector Finishing. E. B. Heyer. *American Electroplaters' Society, Proceedings*, v. 41, 1954, p. 76-78. (TS670 Am35p)

Finishing operations that are performed on metal reflectors. Photographs.

7850 Nickel Plating Troubles and Cures. O. A. Stocker, A. Korbelak, and S. A. Carrano. *American Electroplaters' Society, Proceedings*, v. 41, 1954, p. 83-88. (TS670 Am35p)

Chart covering Ni plating trouble shooting in a general sense. Chart.

7851 Radiometric Study of the Chromium-Sulfate Complex Formed in Chromium Plating Baths. Ronald L. Sass and Stanley L. Eisler. *American Electroplaters' Society, Proceedings*, v. 41, 1954, p. 89-93. (TS670 Am35p)

Determination of the ionic nature of the coordination complex formed and the amount of sulfate so complexed are described. Tables. 11 ref.

7852 Voltage and Current Fluctuations in the Output of Plating Rectifiers. V. L. Richards. *American Electroplaters' Society, Proceedings*, v. 41, 1954, p. 107-115. (TS670 Am35p)

Data on voltage and current fluctuations in the output of Se plating rectifiers. Graphs, tables.

7853 The American Electroplaters' Society Research Program. Earl J. Serfass. *American Electroplaters' Society, Proceedings*, v. 41, 1954, p. 185-187. (TS670 Am35p)

Review of the several active and inactive projects and the results of these activities. Tables.

7854 Copper-Tin Alloy Plating. W. H. Safranek and C. L. Faust. *American Electroplaters' Society, Proceedings*, v. 41, 1954, p. 201-208; disc., p. 208. (TS670 Am35p)

Copper-Sn alloy plates in the composition range of 17 to about 50% Sn, the balance Cu, exhibited good leveling properties and good protection against corrosion. Bronze plus Cr plates were greatly superior to Cu plus Cr. Because of its good performance, bronze alloy is being considered seriously as a replacement for Ni plate. Tables, micrographs, photographs. 12 ref.

7855 A Large-Scale Electroless Nickel Custom Plating Shop. G. Gutzeit and R. W. Landon. *American Electroplaters' Society, Proceedings*, v. 41, 1954, p. 256-260; disc., p. 260-261. (TS670 Am35p)

Commercial application of electroless Ni coatings. Flowsheets, photographs. 3 ref.

7856 Electrodeposition of Chromium. A. T. Vagramyan and D. N. Usachev. *Henry Brutcher Translation No.* 3441, 5 p. (From *Doklady Akademii Nauk SSSR*, v. 98, no. 4, 1954, p. 605-607.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 2158, v. 4, Feb. 1955.

7857* Study of the Overvoltage of Cadmium in Solutions of Cadmium Sulfate. **Étude de la surtension du cadmium dans des solutions de sulfate de cadmium.** (French.) Anne-Marie Baticle. *Comptes rendus*, v. 240, no. 7, Feb. 14, 1955, p. 763-765.

Overvoltage curves are plotted for cadmium cathodes in solutions of cadmium sulfate and in the presence of an excess of sulfuric acid. Graph.

7858* Contribution to the Study of the Electrolysis of Pure Cryolite and Cryolitic Solutions of Alumina. **Contribution à l'étude de l'électrolyse de la cryolithe pure et des solutions cryolithiques d'alumine.** (French.) Pierre Mergault. *Comptes rendus*, v. 240, no. 7, Feb. 14, 1955, p. 765-767.

Measures the decomposition voltage of Al_2O_3 solutions in melted cryolite. Diagram. 5 ref.

7859* Joint Release of Copper and Hydrogen During the Electrolysis of Complex Solutions. **O sovmestnom vydelenii medi i vodoroda pri elektrolize kompleksnykh rastvorov.** (Russian.) E. A. Ukshe and A. I. Levin. *Doklady Akademii Nauk SSSR*, v. 100, no. 5, Feb. 11, 1955, p. 943-946.

Mathematical treatment of the discharge theory. Graphs. 9 ref.

7860* Electrodeposition of Cellulose. C. L. Mantell and Frank Cozzarelli. *Electrochemical Society, Journal*, v. 102, Mar. 1955, p. 110-112.

Cellulose was plated at the anode from solutions containing approximately 1% cellulose, where the solvent is an alkaline sodium zincate modified by additions of urea. Tables. 1 ref.

7861 Electrochemical Behavior of a Titanium-Fused Salt-Platinum Cell. M. E. Straumanis and A. W. Schlechten. *Electrochemical Society, Journal*, v. 102, Mar. 1955, p. 131-136.

Studies of the action of air and moisture during Ti electrolysis. Diagrams, tables, graph. 7 ref.

7862 The Extractive Metallurgy of Zirconium by the Electrolysis of Fused Salts. III. Expanded Scale Process Development of the Electrolytic Production of Zirconium From K_2ZrF_6. Bertram C. Raynes, Edward L. Thellmann, Morris A. Steinberg, and Eugene Wainer. *Electrochemical Society, Journal*, v. 102, Mar. 1955, p. 137-144.

Pilot plant experience indicates further expansion to larger scale operation should be feasible. Photographs, diagrams, tables, graphs. 3 ref.

7863 The Anodic Treatment of Aluminum in Sulfuric Acid Solutions. Roy C. Spooner. *Electrochemical Society, Journal*, v. 102, Apr. 1955, p. 156-162.

Effect of process variables on coating properties. Graphs, table. 10 ref.

7864 Relation of Color to Certain Characteristics of Anodic Tantalum Films. A. F. Torrisi. *Electrochemical Society, Journal*, v. 102, Apr. 1955, p. 176-180.

Color of the anodic film defines the voltage and temperature conditions of formation, which, in turn, determine the properties of the coating. Tables, graphs. 7 ref.

7865* The Oxidation-Reduction Reactoins of Hydrogen Peroxide at Inert Metal Electrodes and Mercury Cathodes. J. O'M. Bockris and L. F. Oldfield. *Faraday Society, Transactions*, v. 51, Feb. 1955, p. 249-259.

Potentials of Pt and Au electrodes in 5M to 10^{-6}M aqueous H_2O_2 from pH 0 to pH 13.5. Tables, diagram, graphs. 45 ref.

7866 The Electroforming of Components and Instruments for Millimetre Wavelengths. A. F. Harvey. *Institution of Electrical Engineers, Proceedings*, v. 102, pt. B, no. 2, Mar. 1955, p. 223-230.

Development of improved methods and processes is described. Table, photographs, diagrams. 24 ref.

7867 Diverse Properties Extend Engineering Uses of Nickel Plating. J. B. Mohler. *Iron Age*, v. 175, Mar. 10, 1955, p. 100-103.

Review of baths, equipment, and plating methods. Properties and applications of Ni and Ni alloy coatings. Photographs, tables, graphs.

7868 Stannous-Fluoride Complexes in a Tin-Nickel Electrolyte. P. A. Brook, A. E. Davies, and J. W. Price. *Journal of Applied Chemistry*, v. 5, Feb. 1955, p. 81-84.

Studies to determine mechanism of electrodeposition of alloys. Transport numbers of various ions in a chloride-fluoride tin-nickel electrolyte were measured by the Hittorf method. Tables. 10 ref.

7869 Design Specifications for Chromium Plating Thickness. J. B. Mohler. *Machine Design*, v. 27, Mar. 1955, p. 161-164.

Thickness requirements for various applications. Diagrams, tables. 3 ref.

7870 Periodic Reverse Current Electroplating. Alan Whittaker. *Machinery (London)*, v. 86, Feb. 25, 1955, p. 416-420.

Process, based on the reversal of the polarity of plated piece, permits bright, surface leveling deposits to be produced at high speeds. Table.

7871 Inhibited Acids in Plating Cycles. J. W. Carroll. *Metal Finishing*, v. 53, Mar. 1955, p. 60-63.

Advantages of inhibitors in baths on the adhesion and appearance of the deposit. Tables. 3 ref.

7872 Electroplating Equipment. Robert Allen. *Metal Industry*, v. 86, Feb. 25, 1955, p. 147-150.

Layout; installation; maintenance. Photographs.

7873 Plating Jigs. J. John Preston. *Metal Industry*, v. 86, Mar. 11, 1955, p. 189-191.

Material; insulation; design; application. Diagrams, tables.

7874* Cyanide Copper Baths, Especially High-Speed Baths. **Zyanidische Kupferbäder, insbesondere Hochleistungsbäder.** (German.) Heinz W. Dettner. *Metalloberfläche*, Ausgabe B, v. 7, no. 3, Mar. 1955, p. 33-35.

Compositions of, and results from different Cu-plating baths. Tables. 15 ref.

7875 Electroplating on Magnesium. H. K. DeLong. *Metal Progress*, v. 67, Apr. 1955, p. 102-108.

Success of electroplating Mg is dependent almost entirely on using a preplate of Zn and on the adhesion and uniformity of this initial coating. Subsequent coatings can be applied according to standard plating practice. Photographs, graphs, table.

7876 Yellow Brass Plating. E. J. Roehl, E. Michel, and L. R. Westbrook. *Plating*, v. 42, Apr. 1955, p. 403-405.

Process by means of which high electrode efficiencies can be obtained at high current densities. Table, graphs.

7877 The Measurement of Current Distribution in an Acid Copper Plating Solution. E. J. Wilhelm and Richard F. Kayser. *Plating*, v. 42, Apr. 1955, p. 406-412.

Method of measuring the current distribution on the cathode with the aid of a small probe electrode. Tables, diagrams, graphs. 5 ref.

7878 Notes on Experiments in Electrodeposition With Perfluorinated Acids. John K. Taylor and Abner Brenner. *Plating*, v. 42, Apr. 1955, p. 413-414.

Value of perfluorinated acids in forming plating baths. Tables.

7879 The Influence of the Physical Metallurgy and Mechanical Processing of the Basis Metal on Electroplating. II. Correlated Abstracts. A. E. R. Westman and F. A. Mohrnheim. *Plating*, v. 42, Apr. 1955, p. 417-421.

Covers the nature, surface, microgeometry, crystal orientation, polish, stresses, and corrosion of the basis metal. 198 ref.

Electrochemistry and Electroprocesses

7880* Copper Anodes for Galvanic Baths. **Les anodes de cuivre.** (French and German.) H. Bovet. *Pro-Metal*, v. 7, no. 43, Feb. 1955, p. 452-456.

Compositions and properties of Cu anodes and baths for various plating conditions. Photograph. 6 ref.

7881* Bulk Anodic Oxidation and Coloring of Small Light Alloy Pieces. **L'oxydation anodique et la coloration en vrac des petites pièces en alliage léger.** (French.) Charles Étienne. *Revue de l'aluminium*, v. 32, no. 217, Jan. 1955, p. 71-79.

Treating of small parts in baskets reduces cost of operation. Diagrams, photographs.

7882* The Current State of Phosphatizing Iron and Non-Ferrous Metals. **Der derzeitige Stand der Phosphatierung von Eisen- und Nichteisenmetallen.** (German.) Willi Machu. *Werkstoffe und Korrosion*, v. 6, no. 2, Feb. 1955, p. 72-79; disc., p. 79-80.

Value of phosphate coatings to prevent corrosion, reduce friction, and as a paint base. Photographs. 27 ref.

7883* Electrolytic Method for Obtaining a Solution of Sodium Stannate. **Elektrolitícheskii sposob polucheniia rastvora stannata natriia.** (Russian.) N. P. Fedot'ev and N. N. Bibikov. *Zhurnal Prikladnoi Khimii*, v. 28, no. 2, Feb. 1955, p. 156-165.

Includes graphs, tables. 4 ref.

Books and Miscellaneous Publications

7884 Modern Aspects of Electrochemistry. J. O'M. Bockris. 344 p. 1954. Academic Press, New York. (QD553 B63m)

Recent theoretical and practical developments in our understanding of electrochemical problems.

7885 Chromium Electroplating. 159 p. PB 11514. U. S. Department of Commerce, Office of Technical Services, Washington, D. C. (TS692.C4 R29c)

Investigates the fundamental principles of Cr deposition and evaluates conditions existing in plating baths from the standpoint of thermodynamic and reaction rate theory.

See also:

7609 (copper plating)
7705 (electric conductivity of molten salts)
7788 (plating of metals)
8311 (chromium plating)
8336 (plating of alloys)

ELECTRONICS

7886 An Analog Electronic Correlator for Acoustic Measurements. Kenneth W. Goff. *Acoustical Society of America, Journal*, v. 27, Mar. 1955, p. 223-236.

Equipment and operation. Diagrams, photograph, circuit diagrams, graphs. 12 ref.

7887* Significance of Electric Contacts During Investigation of Cadmium Sulfide Monocrystals. **Die Bedeutung des elektrischen Kontaktes bei Untersuchungen an Kadmiumsulfid-Einkristallen. II.** (German.) W. M. Buttler and W. Muscheid. *Annalen der Physik*, v. 15, no. 2, 1954, p. 82-111.

Includes diagrams, graphs, table. 33 ref.

7888 Electronic Conductors. Karl K. Darrow. *Bell Laboratories Record*, v. 33, Mar. 1955, p. 85-89.

Review of Hall effect and semiconductor theory. Photographs, diagram, graph.

7889 Operation of the Card Translator. P. Mallery. *Bell Laboratories Record*, v. 33, Mar. 1955, p. 93-97.

Description and operation of equipment for automatic routing of telephone calls. Photographs, diagrams, shadowgraphs.

7890 Junction Tetrode Transistor. R. L. Wallace, Jr. *Bell Laboratories Record*, v. 33, Apr. 1955, p. 121-124.

Applications in H.F., broadband transmission systems. Photographs, diagrams. 2 ref.

7891 Properties of Silicon Power Rectifiers. E. F. Losco. *Communication and Electronics*, 1955, no. 17, Mar., p. 106-111.

Includes photograph, graphs, micrograph, diagram. 2 ref.

7892 Junction Transistors Used as Switches. R. L. Bright. *Communication and Electronics*, 1955, no. 17, Mar., p. 111-121.

Circuits; performance; advantages and limitations. Diagrams, graphs. 2 ref.

7893* A Mechanical Analog Computer for Solving Linear Simultaneous Algebraic Equations. Cyril P. Atkinson. *Computers and Automation*, v. 4, Mar. 1955, p. 12-15, 30.

Design and performance characteristics. Diagram, photograph. 5 ref.

7894 Miniature Cadmium Sulfide and Lead Sulfide Photocells. *Electrical Manufacturing*, v. 55, Apr. 1955, p. 108-113.

Different electrical conductivity in darkness and light. Tables, diagrams, photographs, graphs.

7895 Some Aspects of V.H.F. Sound Broadcasting and F.M. Broadcast Stations. I. P. A. T. Bevan. *Electronic Engineering*, v. 27, Mar. 1955, p. 96-101.

Studies of various types of broadcasting frequencies indicate F.M. is best. Map, table, graphs, photograph. 9 ref. (To be continued.)

7896 The Operation and Loading Characteristics of Valve Oscillators for Dielectric Heating. I. V. L. Atkins. *Electronic Engineering*, v. 27, Mar. 1955, p. 106-111.

Includes diagram, graphs. (To be continued.)

7897 Analysis of the Common-Base Transistor Circuit. Francis Oakes. *Electronic Engineering*, v. 27, Mar. 1955, p. 120-126.

Includes circuit diagrams, tables. 5 ref.

7898 Gain Measurements on Computing Amplifiers. A. B. Johnson. *Electronic Engineering*, v. 27, Mar. 1955, p. 127-129.

Special techniques necessitated by very high gain factors. Diagrams.

7899 An Approximate Treatment of Cascaded Four-Terminal Networks. H. L. Armstrong. *Electronic Engineering*, v. 27, Mar. 1955, p. 130-131.

An approximate expression is derived for the n^{th} power of a 2 x 2 matrix. The result is used in an approximate treatment of a ladder network used as a filter. Diagrams. 6 ref.

7900 A High-Speed Waveform-Sampling Circuit. G. D. Bergman and D. M. MacKay. *Electronic Engineering*, v. 27, Apr. 1955, p. 160-163.

Two practical forms of circuit are described. Table, circuit diagrams. 1 ref.

7901 Transistor Waveform Generators. F. Butler. *Electronic Engineering*, v. 27, Apr. 1955, p. 170-173.

Description of a few useful oscillator and pulse generator circuits. Circuit diagrams. 3 ref.

7902* Noise Problems in Telecommunications Technique. **Rauschprobleme der Nachrichtentechnik.** (German.) W. Kleen. *Elektrotechnische Zeitschrift*, v. 76, Ausgabe A, no. 6, Mar. 1955, p. 209-213.

Survey and correlation of noise sources and possible methods of reducing their effects.

7903* Qualitative and Quantitative Errors of an Automatic Direction Finder (Radio Compass). **Qualitative und quantitative Fehler eines automatischen Peilgerätes (Radiokompass).** (German.) A. Troost and G. Ziehm. *FTZ; Fernmeldetechnische Zeitschrift*, v. 8, no. 2, Feb. 1955, p. 65-70.

Principles of equipment for automatic plotting and the calculation of approximate errors. Diagrams, graphs, circuit diagrams.

7904* Field-Strength Measurements in the Short-Wave Range. **Feldstärkemessungen im Kurzwellenbereich. I.** (German.) J. Grosskopf. *FTZ; Fernmeldetechnische Zeitschrift*, v. 8, no. 2, Feb. 1955, p. 114-118.

A statistical evaluation of a continuous recording of German transmitters. Diagrams, graphs, table. (To be continued.)

7905 A Large Signal Theory of Traveling-Wave Amplifiers. P. K. Tien, L. R. Walker, and V. M. Wolontis. *I.R.E., Proceedings*, v. 43, Mar. 1955, p. 260-277.

Includes graphs, table. 5 ref.

7906 Saturation Current in Alloy Junctions. W. M. Webster. *I.R.E., Proceedings*, v. 43, Mar. 1955, p. 277-280.

New equation for diodes which gives accurate values for the saturation current. Diagram, graph. 5 ref.

7907 Logical and Control Functions Performed With Magnetic Cores. S. Guterman, Robert D. Kodis, and S. Ruhman. *I.R.E., Proceedings*, v. 43, Mar. 1955, p. 291-298.

Includes diagrams. 11 ref.

7908 Electrical Characteristics of Power Transistors. Allen Nussbaum. *I.R.E., Proceedings*, v. 43, Mar. 1955, p. 315-322.

Frequency-dependent parameters are in good agreement with theory but differences exist in those based on functions of the current. Diagram, graphs, circuit diagram, table. 11 ref.

7909 The "M"-Type Carcinotron Tube. R. R. Warnecke, P. Guénard, O. Doehler, and B. Epsztein. *I.R.E., Proceedings*, v. 43, Apr. 1955, p. 413-424.

Theoretical and experimental results concerning the "M Carcinotron." Diagrams, graphs, oscillogram, photographs. 16 ref.

7910 Power Flow in Electron Beam Devices. W. H. Louisell and J. R. Pierce. *I.R.E., Proceedings*, v. 43, Apr. 1955, p. 425-427.

Discusses devices in which electrons are constrained to move in the z direction only. 4 ref.

7911 The Effective Surface Recombination of a Germanium Surface With a Floating Barrier. A. R. Moore and W. M. Webster. *I.R.E., Proceedings*, v. 43, Apr. 1955, p. 427-435.

Includes diagrams, graphs. 13 ref.

7912 The Nature of the Uncorrelated Component of Induced Grid Noise. T. E. Talpey and A. B. Macnee. *I.R.E., Proceedings*, v. 43, Apr. 1955, p. 449-454.

At higher operating frequencies, induced grid noise is the limiting factor in low-noise amplifier design. Graphs, table. 20 ref.

7913 On the Possibility of Amplification in Space-Charge-Potential-Depressed Electron Streams. Walter R. Beam. *I.R.E., Proceedings*, v. 43, Apr. 1955, p. 454-462.

Derivation of a characteristic wave equation for an electron stream. Diagrams, photographs, graph. 19 ref.

7914 Measurement of Minority Carrier Lifetime and Surface Effects in Junction Devices. S. R. Lederhandler and L. J. Giacoletto. *I.R.E., Proceedings*, v. 43, Apr. 1955, p. 477-483.

Describes a simple method for the measurement of effective lifetimes of injected minority carriers. Circuit diagrams, table, diagrams, graph. 14 ref.

7915 Resonance Phenomena in Time-Varying Circuits. M. C. Herrero. *Institute of Radio Engineers, Transactions of the I.R.E. Professional Group on Circuit Theory*, v. CT-2, no. 1, Mar. 1955, p. 35-41. (TK1 In6.6c)

Results of a study of the sweeping-filter problem and its application to a panoramic receiver. Various types of parametric excitation are compared and physical interpretation of the behavior is presented. Diagrams, circuit diagram. 12 ref.

7916 Transistor Circuitry for Digital Computers. C. L. Wanlass. *Institute of Radio Engineers, Transactions of the I.R.E. Professional Group on Electronic Computers*, v. EC-4, no. 1, Mar. 1955, p. 11-16. (TK1 In6.6e)

Circuitry is presented that enables the construction of a digital computer which will operate at a clock frequency of 200 kc. or less. Graphs, table.

7917 An Experimental Study of the Propagation of 10 cm Radio Waves Over a Short Non-Optical Sea Path. E. F. Stack-Forsyth. *Institution of Electrical Engineers, Proceedings*, v. 102, pt. B, no. 2, Mar. 1955, p. 231-236.

Effect upon signal strength of variations in the structure of the refractive-index profile of the atmosphere in the first few hundred ft. above sea level. Table, map, graphs. 5 ref.

7918 The Response of a Non-Linear System to Random Noise. W. E. Thomson. *Institution of Electrical Engineers, Proceedings*, v. 102, pt. C, no. 1, Mar. 1955, p. 46-48.

Formula for the auto-correlation function of the output of a non-linear system. 6 ref.

7919 The Function of Basic Elements in Digital Systems. C. B. Speedy. *Institution of Electrical Engineers, Proceedings*, v. 102, pt. C, no. 1, Mar. 1955, p. 49-56.

Properties and use of an element which consists of a bistable element and two gates are described. Diagrams, oscillograms. 18 ref.

7920 The McIlroy Fluid Network Analyzer. Robert C. Moore. *Instruments and Automation*, v. 28, Mar. 1955, p. 428-429.

Use of Fluistors to simulate flow of fluids in study of pipe line systems. Photographs.

7921 Electronic Circuitry. Charles Keezer and Milton Aronson. *Instruments and Automation*, v. 28, Mar. 1955, p. 442-443.

Six basic circuits of wide application. Circuit diagrams.

7922 Application of the Electronic Differential Analyzer to the Oscillation of Beams, Including Shear and Rotary Inertia. C. E. Howe and R. M. Howe. *Journal of Applied Mechanics*, v. 22, Mar. 1955, p. 13-19.

Includes circuit diagrams, graphs, tables. 12 ref.

7923 Annual Report, 1954 Conference on Electrical Insulation. *National Academy of Sciences, National Research Council, Division of Engineering and Industrial Research*, Mar. 1955, 67 p. (TK3401 N21a)

Presents condensations of 31 papers.

7924 The Theory and Construction of Germanium Diodes. J. C. van Vessem. *Philips Technical Review*, v. 16, Feb. 1955, p. 213-224.

Includes photographs, diagrams, graphs. 4 ref.

7925 The Application of Point-Contact Germanium Diodes. J. Jager. *Philips Technical Review*, v. 16, Feb. 1955, p. 225-232.

Relative advantages and disadvantages of Ge and vacuum diodes. Photograph, circuit diagrams, graphs. 1 ref.

7926 On the Measurement of Minority Carrier Lifetime in n-Type Silicon. J. B. Arthur, W. Bardsley, A. F. Gibson, and C. A. Hogarth. *Physical Society, Proceedings*, v. 68, no. 423B, Mar. 1955, p. 121-129.

Includes graphs. 16 ref.

7927 Phototransistors and Photoelectrets. Edward D. Padgett. *Radio-Electronics*, v. 26, Feb. 1955, p. 61-63.

Electronic switches which can be triggered on and off by a light beam. Photographs, diagrams, graphs. 2 ref.

7928* Calculation of a Cathodic Repeater. **K raschetu katodnogo povtoritelia.** (Russian.) G. S. Tsykin. *Radiotekhnika*, v. 10, no. 1, Jan. 1955, p. 37-44.

Comparison of coefficient of amplification with respect to voltage. Frequency-phase characteristics in the higher and lower operating frequencies. Circuit diagrams, table. 6 ref.

7929* Amplifier Noises of Ultra-High Frequencies. **Skumy usilitelei sverkhvysokikh chastot.** (Russian.) E. P. Dement'ev. *Radiotekhnika*, v. 10, no. 1, Jan. 1955, p. 45-52.

Relationship between noise parameters; general expressions of noise coefficients. Analysis of single-cascade amplifiers circuits. Circuit diagrams, table. 4 ref.

7930* New Method of Phase Modulation. **Novyi metod fazovoi moduliatsii.** (Russian.) A. D. Artym. *Radiotekhnika*, v. 10, no. 1, Jan. 1955, p. 53-60.

Electronics

Based on the use of non-linear amplitude modulation, the method permits higher phase deviations to be obtained. Circuit diagrams, graphs. 3 ref.

7931 Delayed Collector Conduction, a New Effect in Junction Transistors. M. C. Kidd, W. Hasenberg, and W. M. Webster. *RCA Review*, v. 16, Mar. 1955, p. 16-33.

Includes graphs, diagrams, circuit diagrams. 6 ref.

7932 Revolution in Rectifiers. Van Caldwell. *Steel*, v. 136, Mar. 21, 1955, p. 116-119.

Manufacture, properties, and applications of Ge, Se, and Si rectifiers. Photographs, diagrams.

7933* Waveguides and Waveguide Junctions. J. M. C. Dukes. *Wireless Engineer*, v. 32, Mar. 1955, p. 65-72.

A geometrical analysis of the properties of a microwave component through a junction. Diagrams. 14 ref.

7934* Waveguide Phase Changer. R. E. Collin. *Wireless Engineer*, v. 32, Mar. 1955, p. 82-88.

A qualitative approach to the properties and uses of changers; design and performance of a rectangular changer with a linear characteristic. Diagrams, graphs, tables. 16 ref.

Books and Miscellaneous Publications

7935 The I.R.S.I.A.-F.N.R.S. Calculating Machines. **La machine mathématique I.R.S.I.A.-F.N.R.S.** (French.) M. Linsman and W. Pouliart. 47 p. (TK7872.C5 L65m)

Describes the construction and operation of the Bell Telephone Manufacturing Company's machines in Belgium.

7936 Handbook of Microwave Measurements. Moe Wind and Harold Rapaport, editors. v. I-II. Articles individually paged. 1954. Polytechnic Institute of Brooklyn. (QC668 W72h)

Measurement of wave, propagation, and circuit characteristics.

See also:

7690 (properties of semiconductors)
7866 (wave guides manufactured by electroforming techniques)
8321 (diffusion in a semiconductor)

ENGINEERING ECONOMICS

7937 Arc-Welding Costs. A. G. Thompson. *British Welding Journal*, v. 2, Mar. 1955, p. 134-141.

Reviews economic aspects of welding procedures and costs of labor, electrodes, and electric power. Tables, diagram. 21 ref.

7938 What Will Happen to These Earnings? Jack D. Joffe. *Chemical Engineering*, v. 62, Apr. 1955, p. 195-198.

Study of the fate of three plants, based on different financial structures, in a dynamic economy. Tables, graphs.

7939 The Selection of a Plant Site. S. P. Smith. *Chemical Engineering Progress*, v. 51, Mar. 1955, p. 134-138.

Lists 14 factors for consideration. Maps.

7940* Wire Industry and Products Using Wire. **Przemysł druciarski i wyrobów z drutu.** Bernard Maligłowski. *Hutnik*, v. 21, no. 11, Nov. 1954, p. 345-346.

Pre- and post-war tonnage of wire produced in Poland; ratio of foreign to native capital; 1945 reorganization. Tables.

7941 Resources—South Atlantic States. *Industrial and Engineering Chemistry*, v. 47, Mar. 1955, pt. 1, p. 422-447.

Industrial opportunities, mineral resources, chemicals, textiles, and finance. Tables, graphs, map. 244 ref.

7942 The Automatic Factory—A Critical Examination. Stephen A. June, John D. Bardis, Lee H. Lurio, Leonard S. Polaner, Oystein Sagedahl, Herbert A. Sklenar, and Bernard K. Yenkin. *Instruments and Automation*, v. 28, Mar. 1955, p. 430-435.

Factors entering cost-determination analysis. Diagrams, tables. 8 ref.

7943* Selling Surface Coatings Through Sample Distribution. D. C. Sayles. *Official Digest. Federation of Paint and Varnish Production Clubs*, v. 27, Mar. 1955, p. 174-184.

Adequacies of various paint marketing methods. Charts.

7944 Nickel-Cobalt Resources of Cuba. W. D. McMillan and H. W. Davis. *U. S. Bureau of Mines, Report of Investigations* 5099, Feb. 1955, 86 p. (TN21 Un3r)

World reserves of Ni ore; metallurgical investigations and mining of Cuban Ni-Co ores. Tables, maps, photographs, charts. 14 ref.

7945 Annual Report on Scientific and Industrial Research and Technological Advance, 1953. *U. S. Department of Commerce, Office of Technical Services*, PB 111426, 1953, 214 p. T177.G3 Un3.3a)

Second annual report of progress in Germany in the fields of manufacturing, transportation, and agriculture.

Books and Miscellaneous Publications

7946 Approaches to Economic Development. Norman S. Buchanan and Howard S. Ellis. 494 p. 1955. The Twentieth Century Fund, New York. (HC60 B85r)

Analysis of factors influencing the development or lack of development in various countries.

7947 Growth and Stagnation in the European Economy. Ingvar Svennilson. 342 p. 1954. United Nations Economic Commission for Europe, Geneva, Switzerland. (HC240 Un2.2g)

Study of the long term trends in European industry and commerce.

7948 Western Area Development Conference, Proceedings. 103 p. 1954. Standford Research Institute, San Francisco. (T56 W52p)

Fourteen papers on natural resources, manpower, and industrial development in the western part of U. S.

See also:

7787 (industrial painting costs)
8115 (costs of oxygen converter practice)
8483 (output of plasticizers)
8531 (development of man-made fibers)
8572 (papermaking costs)

FLUID MECHANICS

7949* How Drops Are Formed From Gas or Vapour Bubbles. New Light on Liquid Entrainment. D. M. Newitt, N. Dombrowski, and F. Knelman. *Chemical & Process Engineering*, v. 36, Mar. 1955, p. 85-86.

Behavior studied by high-speed photography.

7950* Unsteady Flow of a Viscous Liquid When External Forces Are Present. **O nestatsionarnom techenii viazkoi zhidkosti pri nalichii vneshnikh sil.** (Russian.) A. A. Kiselev. *Doklady Akademii Nauk SSSR*, v. 100, no. 5, Feb. 11, 1955, p. 871-874.

Mathematical treatment. 5 ref.

7951 On the Stability of Parallel Flows With Respect to Periodic Disturbances. Shih-I Pai. *Franklin Institute, Journal*, v. 259, Mar. 1955, p. 197-208.

Mathematical analysis. 4 ref.

7952 Fluid Mechanics Studies. Transition Phenomena in Pipes and Annular Cross Sections. R. S. Prengle and R. R. Rothfus. *Industrial and Engineering Chemistry*, v. 47, Mar. 1955, pt. 1, p. 379-386.

Flow in three pipes and fine annuli is followed by injected dye filaments. Tables, graphs, diagram. 13 ref.

7953* Models of Hydraulic Structures. David H. Kent. *Instrument Engineer*, v. 1, Apr. 1955, p. 135-143.

Theory of scale models applied to three hydroelectric projects. Diagrams, graphs, photographs. 20 ref.

7954 Two-Dimensional Flow About Half Bodies Between Parallel Walls. John P. Breslin. *Journal of Applied Mechanics*, v. 22, Mar. 1955, p. 35-40.

Includes diagrams, graphs. 6 ref.

7955* Friction and Heat Exchange in a Turbulent Stream. **Trenie i teploobmen v turbulentnom potoke.** (Russian.) G. P. Piterskikh. *Khimicheskaia Promyshlennost'*, 1954, no. 8, Dec., p. 480-485.

Distribution of speeds; coefficient of friction in round tubes. Comparison with experimental data. Graphs. 7 ref.

7956 Precision Measurement of Detonation and Strong Shock Velocity in Gases. Herbert T. Knight and Russell E. Duff. *Review of Scientific Instruments*, v. 26, Mar. 1955, p. 257-260.

Includes photograph, circuit diagrams. 6 ref.

7957* Problem of the Stability of the Plane Convective Motion of a Liquid. **K voprosu ob ustoichivosti ploskogo konvektivnogo dvizheniia zhidkosti.** (Russian.) G. Z. Gershuni. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 2, Feb. 1955, p. 351-357.

Mathematical-analytical treatment. Graph, diagram. 7 ref.

Books and Miscellaneous Publications

7958 Fluid Mechanics With Engineering Applications. R. L. Daugherty and A. C. Ingersoll. 5th Ed. 472 p. 1954. McGraw-Hill, New York. (TC160 D26f5)

Applicable to all fluids, including vapors and gases.

See also:

7546 (liquid-liquid extraction)
7557 (inclined falling films)
8017 (liquid flow measurement)

FOOD TECHNOLOGY

7959* **Flavouring Agents.** D. Etchells. *Chemist and Druggist*, v. 163, Apr. 2, 1955, p. 376, 379.

Masking qualities of several flavors are determined by a panel of tasters. 4 ref.

7960* Nutritional Adequacy of a Semi-Synthetic Diet Sterilized by Steam or by Cathode Rays. Thomas D. Luckey, Morris Wagner, James A. Reyniers, and F. L. Foster, Jr. *Food Research*, v. 20, Mar.-Apr. 1955, p. 180-185.

Includes tables, graph. 4 ref.

7961 The Alkaline Hydrolysis of Haddock Actomyosin. I. Ammonia Formation. II. Peptide-Bond Hydrolysis. P. M. Nottingham. *Journal of the Science of Food and Agriculture*, v. 6, Feb. 1955, p. 82-90.

Includes graphs, tables. 34 ref.

7962 The Nitrogenous Extractives From Fresh Fish Muscle. III. Comparison of Several Flat Fishes and Members of the Herring-Mackerel Group. J. M. Shewan. *Journal of the Science of Food and Agriculture*, v. 6, Feb. 1955, p. 99-104.

Fractionation by displacement chromatography on ion-exchange resins shows the presence of a variety of amino-acids in addition to creatine, creatinine, and trimethylamine oxide. Graphs. 22 ref.

7963 Toxicity of Metals. Sources of Contamination and Assessment. A. D. Merriman. *Metal Treatment and Drop Forging*, v. 22, Mar. 1955, p. 127-131, 118.

Possible sources of contamination of food by metallics and the degree of "pick-up". Harmful dosages of the more common metals. 16 ref.

7964 Nutritional Changes in Diets Exposed to Ethylene Oxide. Edgar A. Hawk and Olaf Mickelsen. *Science*, v. 121, Mar. 25, 1955, p. 442-444.

Shows serious impairment; thiamine supplementation helps. Table.

See also:

7640 (feed stabilizers)

FUELS AND COMBUSTION

7965* Bagasse as a Fuel. **Bagassefeuerungen.** (German.) F. Michel. *Brennstoff-Wärme-Kraft*, v. 7, no. 3, Mar. 1955, p. 102-107.

Fuel value; design of firing chambers; drying and grinding processes. Tables, diagrams, photographs, graph. 20 ref.

7966* Semicarbonization of Coal in the Fluidized State. **La semi-carbonisation de la houille à l'état fluidisé.** (French.) André Antoine Peytavy and Jean Lahouste. *Bulletin de la société chimique de France*, 1955, no. 3, Mar., p. 453-454.

Includes diagram.

7967 Influence of Physical Factors in Igniting Pulverized Coal. Bimalendu Ghosh and A. A. Orning. *Combustion*, v. 26, Mar. 1955, p. 57-61.

Includes diagrams, table, graphs. 10 ref.

7968* Oil Vaporization With the Aid of Solid Heat Carriers. **Ölvergasung mit Hilfe fester Wärmeträger.** (German.) Werner Wustrow and Helmut Kratz. *Erdöl und Kohle*, v. 8, no. 2, Feb. 1955, p. 82-86.

Methods and results of cracking and vaporizing heavy oils by passing over hot solid materials. Diagrams, graphs, tables. 13 ref.

7969 Fuels of the Future. L. K. Sillcox. *Franklin Institute, Journal*, v. 259, Mar. 1955, p. 183-195.

Future possibilities of obtaining energy from atomic, solar, and other sources. 4 ref.

7970* Gas in the Atomic Age. R. C. Lisk. *Gas Age*, v. 115, Apr. 7, 1955, p. 28 + 5 pages.

Role and problems of the gas supplier in peace and war. Map.

7971* Theory and Design of Aerated Burners. J. A. Prigg. *Gas Journal*, v. 281, Mar. 9, 1955, p. 650-654.

Includes diagram, photographs, graph, tables. (To be continued.)

7972 Entrained-Solids Retorting of Colorado Oil Shale. Equipment and Operation. H. W. Sohns, E. E. Jukkola, R. J. Cox, F. E. Brantley, W. G. Collins, and W. I. R. Murphy. *Industrial and Engineering Chemistry*, v. 47, Mar. 1955, pt. 1, p. 461-464.

Shale entrained in steam and retorted from 1000 to 1650 F. System shows excellent control. Tables, graphs, diagram. 4 ref.

7973 The Venturi Washer for Blast Furnace Gas. J. E. Eberhardt and H. S. Graham. *Iron and Steel Engineer*, v. 32, Mar. 1955, p. 66-71; disc., p. 71-72.

New venturi type blast furnace gas washer promises efficient cleaning at water consumptions as low as 5-gal. per thousand cu. ft. of gas. Diagrams, photographs, graphs.

7974 Combustion Temperatures and Gas Composition. R. Vichnievsky, B. Sale, and J. Marcadet. *Jet Propulsion*, v. 25, Mar. 1955, p. 105-118.

Shows the possibility of the rapid approximative calculation of the combustion temperatures, taking into account the dissociation phenomena, in a very wide range of thermodynamic conditions. Tables, graphs. 14 ref.

7975 Infrared Emission and Absorption in an Ammonia-Oxygen Diffusion Flame. David A. Dows, Eric Whittle, and George C. Pimentel. *Journal of Chemical Physics*, v. 23, Mar. 1955, p. 499-502.

Emissions of OH, NH_3, and H_2O and the absorptions of NH_3 and H_2O were studied as a function of position in the flame. Table, spectra, graphs. 5 ref.

7976 The Determination of Burning Velocities of Slow Flames. G. N. Badami and Alfred Egerton. *Royal Society, Proceedings*, v. 228, ser. A, Mar. 8, 1955, p. 297-321.

Measurements of the burning velocities of a no. of gases in air are made by the flat-flame burner method. Diagram, graphs, tables. 32 ref.

7977* Measuring the Reactivity of Solid Fuels. **Måling av reaktivitet av faste brennstoffer.** (Norwegian.) Oluf Chr. Bøckman. *Tidsskrift for Kjemi, Bergvesen og Metallurgi*, v. 14, no. 10, Dec. 1954, p. 191-195.

Electrochemical method; reactivity scale; diffusion resistance; applications and advantages. Diagrams, graphs.

7978 Production Operating Experience With Oxygen in the Kerpely Producer at Louisiana, Mo. L. F. Willmott, H. R. Batchelder, and R. F. Tenney. *U. S. Bureau of Mines, Report of Investigations* 5108, Feb. 1955, 16 p. (TN21 Un3r)

Synthesis gas production using O and saturated steam was found to be a reliable method. Diagrams, tables, graphs. 6 ref.

Fuels and Combustion

7979* Investigation of Porous Structure of Active Coals by Complex Methods. **Issledovanie poristoi struktury aktivnykh uglei kompleksnymi metodami.** (Russian.) M. M. Dubinin. *Uspekhi Khimii*, v. 24, no. 1, 1955, p. 3-13 + 1 plate.

Methods for calculation of micro-, macro-, and transitional pores. Graphs, micrographs, tables. 23 ref.

See also:

7600 (thermal capacity of coal)
7602 (coal and coke analysis)
7672 (analysis of gases)
7717 (gasification rates of carbon rods)
7718 (temperatures of nitrate esters)
7719 (diffusion flame method)

GEOLOGY AND MINERALOGY

7980* **The Crystal Structure of Chabazite and Its Sorptive Properties.** G. L. Kington and W. Laing. *Faraday Society, Transactions*, v. 51, Feb. 1955, p. 287-298 + 2 plates.

Qualitative agreement exists between experiment and theory. Tables, graphs, diagram. 26 ref.

7981* Mineralogical Investigations of Alkali Feldspars. **Mineralogische Untersuchungen an Alkalifeldspäten.** (German.) Horst Lange. *Silikattechnik*, v. 6, no. 1, Jan. 1955, p. 15-21.

Structures; effect of albite content on temperature of crystallization; optical and X-ray studies; high-temperature homogenization. Graphs, diagrams, micrographs, tables. 21 ref.

Books and Miscellaneous Publications

7982 The Geology of South Africa. Alex. L. du Toit. 3rd Rev. Ed. 611 p. 1953. Hafner Publishing Co., New York. (QE325 D95g3)

Stratigraphy; historical and geographic studies.

See also:

7599 (spectral analysis in geochemistry)

GEOPHYSICS

7983 Design and Evaluation of Large-Scale Rain-Making Experiments. B. J. Mason. *Nature*, v. 175, Mar. 12, 1955, p. 448-451.

Difficulties are discussed; AgI seeding is used. 7 ref.

Books and Miscellaneous Publications

7984 Aspects of Deep Sea Biology. N. B. Marshall. 380 p. 1954. Philosophical Library, New York. (QH91 M35a)

Exploration procedures. Anatomy and history of deep-sea life.

See also:

7499 (marine mycology)
8024 (oceanographic instrumentation)

GRAPHIC ARTS

7985* **Offset for Profits.** Henry R. Davis. *International Blue Printer*, v. 28, Apr. 1955, p. 26-27.

Market possibilities are explained in five "case-history" examples. Photographs.

7986* Plastics in the Graphic Industry. **Plaste in der grafischen Technik.** (German.) E. Rupp. *Plaste und Kautschuk*, v. 2, no. 1, Jan. 1955, p. 4-9.

Advantages of replacing metal by plastic materials for the various parts used in the printing industry. Tables, photographs, diagram. 6 ref.

7987* **High-Speed Motion Photography.** Robert D. Hawkins. *Sperry Engineering Review*, v. 8, Jan.-Feb. 1955, p. 15-20.

Describes the use of a camera which exposes up to 8,000 frames per sec. for the study of vibration and shock motion. Photographs, graphs.

7988* Investigation of Resolution Capacity of Multilayer Materials for Color Photography. **Issledovanie razreshaiushchei sposobnosti mnogosloinykh tsvetofotograficheskikh materialov.** (Russian.) Iu. N. Gorokhovskii and P. Kh. Pruss. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 2, Feb. 1955, p. 221-235.

Includes graphs, tables. 16 ref.

HEAT POWER

7989* Instability of Combustion in Liquid Propellent Rocket Motors. Low-Frequency Oscillation Phenomena. **Instabilità della combustione negli endoreattori a propellenti liquidi. Fenomeni oscillatori di bassa frequenza.** (Italian.) Ernesto Macioce. *Aerotecnica*, v. 34, no. 6, Dec. 1954, p. 319-325.

General discussion of instability in combustion chambers. Constant pressure and feed rate systems; servo stabilization of L.F. oscillations. Diagrams. 8 ref.

7990 On the Evaporation of a Drop of Volatile Liquid in High-Temperature Surroundings. William E. Ranz. *American Society of Mechanical Engineers, Paper No.* 54—A-143, 1954, 8 p. (TJ1 Am35p)

Transfer of heat by mass transfer, radiation, and conduction. 7 ref.

7991 Some Factors Affecting Fly-Ash Collector Performance on Large Pulverized Fuel-Fired Boilers. Carl R. Flodin and Harold H. Haaland. *American Society of Mechanical Engineers, Paper No.* 54—A-212, 1954, 9 p. + 3 plates. (TJ1 Am35p)

Factors of operation and design to be considered in evaluation of collectors. Diagrams, graph. 16 ref.

7992 Centrifugally-Scavenged Two-Cycle Engines. John Fullemann and T. O. Kuivinen. *American Society of Mechanical Engineers, Paper No.* 54-A-254, 1954, 10 p. + 3 plates. (TJ1 Am35p)

Design of blower. Photographs, diagrams, graphs. 3 ref.

7993* Investigation of Initial Stages in Combustion Processes. **Die Erforschung der Initialvorgänge bei Verbrennungsprozessen.** (German.) Irene Sänger-Bredt. *Astronautica Acta*, v. 1, no. 1, 1955, p. 1-31.

Reactions occurring in individual mol. encounters are explored. Tables. 152 ref.

7994 Indicated Instantaneous Temperatures of Liquid Rocket Exhausts and Combustion Chambers. J. H. Hett and J. B. Gilstein. *Jet Propulsion*, v. 25, Mar. 1955, p. 119-127.

A modified two-path method was used to measure temperatures of the exhaust and combustion chamber flames of 1500-lb.-thrust alcohol-oxygen rockets. Photographs, graphs, diagram, tables. 7 ref.

Books and Miscellaneous Publications

7995 Bringing Gas Turbines Down to Earth. Charles A. Krasne. 140 p. (TJ778 K86b)

Principles, characteristics, history, applications, and future prospects of gas turbines.

7996 Electrical Ignition Equipment. F. G. Spreadbury. 227 p. 1954. Constable & Company, London. (TJ773 Sp77e)

Principles, construction, design, and testing are treated, as well as engine requirements and conditions relevant to ignition.

See also:

8045 (turbine blade vibration)

INFORMATION—PREPARATION AND DISSEMINATION

7997 The Effective Use of a Technical Library. D. W. Berryman. *Oil & Colour Chemists' Association, Journal*, v. 38, Mar. 1955, p. 134-142.

Covers mission and functions. Diagrams. 9 ref.

Books and Miscellaneous Publications

7998 Studies in Coordinate Indexing. Mortimer Taube. v. II. 111 p. 1954. Documentation, Inc., Washington, D. C. Z1001 T19s)

Developments in the Uniterm system of classifying information and possibilities of mechanizing the operations.

INSTRUMENTATION AND LABORATORY APPARATUS

7999 An Acoustic Intensity Meter. Stuart Baker. *Acoustical Society of America, Journal*, v. 27, Mar. 1955, p. 269-273.

A device is described for measuring the intensity of an acoustic wave at a point. Diagram, graphs, photographs. 6 ref.

8000 Improved Apparatus for Zone Electrophoresis. Arthur M. Crestfield and Frank Worthington Allen. *Analytical Chemistry*, v. 27, Mar. 1955, p. 422-423.

Caffeine used as uncharged reference substance. Table, diagram. 15 ref.

8001 A High Rate of Shear Rotational Viscometer. E. M. Barber, J. R. Muenger, and F. J. Villforth, Jr. *Analytical Chemistry*, v. 27, Mar. 1955, p. 425-429.

Details for a device for operation at shear rates up to 1,000,000 reciprocal sec. Table, graphs, diagram, photographs. 15 ref.

8002 Applications of Curved-Crystal X-Ray Spectrometers. Microanalysis and Simultaneous Analysis. L. S. Birks and E. J. Brooks. *Analytical Chemistry*, v. 27, Mar. 1955, p. 437-440.

Niobium, Hf, Ta, Th, and U in p.p.m. quantities detected together with Cr, Ni, and Mo. Tables, graph, diagrams, photographs. 5 ref.

8003 Salt Bridges of Porous Glass and Ion Exchange Membranes. W. N. Carson, Jr., C. E. Michelson, and Karl Koyama. *Analytical Chemistry*, v. 27, Mar. 1955, p. 472-473.

Systems are illustrated. Diagrams.

8004 Gravitometer for Rapid Density Measurement of Solids. S. Lipson, A. Saia, and H. Rosenthal. *ASTM Bulletin*, 1955, no. 205, Apr., p. 60-63.

Apparatus consists of a cylinder containing two immiscible liquids, alcohol floating on Hg. Their relative displacements, by the sample, are the basis for the density determination. Graphs, photograph, diagrams.

8005* The Determination of ^{65}Zn in Tissues With Geiger and Scintillation Counters. T. E. Banks, R. Tupper, R. W. E. Watts, and A. Wormall. *Biochemical Journal*, v. 59, Jan. 1955, p. 149-152.

Scintillation counter is detailed. Diagram, tables. 14 ref.

8006* An Apparatus for Continuous Electrophoresis on Paper. E. S. Holdsworth. *Biochemical Journal*, v. 59, Feb. 1955, p. 340-345.

Uses a flowering electrode system. Table, diagrams, photograph. 11 ref.

8007* Apparatus for Fractional Molecular Sublimation. **Appareil à sublimation moléculaire fractionnée.** (French.) Alexis Dufour and Jean-Charles Pariaud. *Bulletin de la société chimique de France*, 1955, no. 3, Mar., p. 419-420.

Advantages of apparatus. Diagram. 1 ref.

8008 Techniques of Telemetering. S. D. Ross. *Consulting Engineer*, v. 5, Mar. 1955, p. 60-63, 78.

Pneumatic and electric methods. Diagrams, photograph.

8009 Measure Motion to 0.0001 In. Without Friction or Wear. J. H. Brown. *Control Engineering*, v. 2, Apr. 1955, p. 50-52.

Experiments with optical gratings and photocell pickups demonstrate the practicality of using light pulses to measure machine tool travel to an accuracy of millionths o fan in. Circuit diagrams.

8010 High-Pressure Measurement and Control. W. H. Howe. *Control Engineering*, v. 2, Apr. 1955, p. 53-59.

Equipment and techniques. Table, photographs, diagrams, graph, circuit diagram.

8011 How Temperature Affects Instrument Accuracy. Robert Gitlin. *Control Engineering*, v. 2, Apr. 1955, p. 70-78.

Includes graphs, diagrams, tables.

8012 A High-Speed Revolution Counter. E. L. Harrington. *Electronic Engineering*, v. 27, Apr. 1955, p. 142-146.

Measures the rotational speed of gas turbine engines to within ± 1 r.p.m. at 20,000 r.p.m. Table, circuit diagrams, photographs. 6 ref.

8013 Size Distribution in Fine Powders. *Engineering*, v. 179, Mar. 25, 1955, p. 378-379.

Based on Stokes' law of fall with continuous graphical recording. Graph, diagrams, photograph.

8014 Metal-Film Resistance Thermometers for Measuring Surface Temperatures. C. C. Winding, L. Topper, and B. V. Baus. *Industrial and Engineering Chemistry*, v. 47, Mar. 1955, pt. 1, p. 386-392.

Describes preparation of thermometers on several glasses. Instruments give immediate response without introducing variables. Graphs, diagrams. 13 ref.

8015* Gas Analysis by Thermal-Conductivity Measurement. G. B. Brown and R. W. Dean. *Instrument Engineer*, v. 1, Apr. 1955, p. 145-150.

Application of method and equipment available. Tables, diagrams, photographs. 4 ref.

8016 How Accurate Are Your Temperature Reference Baths? A. B. Kaufman and P. R. Mitchell. *Instruments and Automation*, v. 28, Mar. 1955, p. 450-451.

Corrections for effects of water composition and atmospheric pressure variations on thermocouple reference junctions. Table, graphs. 5 ref.

8017 Measurement of Liquid Flow by Positive-Displacement Meters. Paul A. Mankin. *Instruments and Automation*, v. 28, Mar. 1955, p. 453-457.

Includes graphs, diagrams.

8018* The Present Status of High Pressure Measurement and Control. II. Wilfred H. Howe. *ISA Journal*, v. 2, Apr. 1955, p. 109-113.

As applied to temperature, liquid level, flow, and other measurements. Diagrams.

8019* New Differential Thermal Analysis Apparatus. **Nouveau dispositif d'annalyse thermique différentielle.** (French.) Capdecomme and Pulou. *Métaux, Corrosion-Industries*, v. 30, no. 353, Jan. 1955, p. 34-36.

Includes diagram, graphs.

8020 Specifying and Designing Test Stands. Edwin M. Canner and Betty S. Welch. *Product Engineering*, v. 26, Mar. 1955, p. 156-159.

Design factors for electrical, electronic, hydraulic, or pneumatic types. Photographs, circuit diagrams.

8021 Recording Systems to Obtain and Preserve Transient Data. Howland B. Jones, Jr. *Product Engineering*, v. 26, Mar. 1955, p. 180-185.

How to select pneumatic, electric self-balancing, direct-writing or mirror galvanometer oscillographs for frequencies up to 8000 c.p.s. and from 1 to 48 channels. Tables, diagrams, graph, photographs.

8022 Development of Reflecting Microscopes. K. P. Norris. *Research*, v. 8, Mar. 1955, p. 94-101.

Traces the history of the microscope and describes the properties and advantages of the reflecting objective design. Diagrams. 61 ref.

8023* Temperature Control of Electric Heat Treating Furnaces. **Temperaturregulierung von Elektroöfen zur Wärmebehandlung.** (German.) J. Horowitz. *Sprechsaal*, v. 88, no. 4, Feb. 20, 1955, p. 69-71.

Includes circuit diagrams, photograph. 33 ref.

Books and Miscellaneous Publications

8024 Symposium on Oceanographic Instrumentation. John D. Isaacs and Columbus O'D. Iselin, editors. 233 p. 1952. National Academy of Sciences-National Research Council, Washington, D. C. (GC41 Un3.5o)

Instrumentation and Laboratory Apparatus

Consists of 12 papers and discussions presented at a conference sponsored by the Office of Naval Research at Rancho Santa Fe, Calif., in June, 1952.

8025 The Design and Use of Instruments and Accurate Mechanism. T. N. Whitehead. 283 p. 1954. Dover Publications, New York. (Q185 W58d)

Sources of errors in instruments. Principles of design and use.

8026 "The Complete Papers and Talks of the 1953 National Telemetering Conference." 230 p. National Telemetering Conference, Chicago. (TK399 N21c)

Seventeen papers on telemetering equipment, operation, and applications.

See also:

7535 (infra-red analyzers in petroleum refineries)
7590 (apparatus for halide analysis)
8246 (thermal conductivity measurement of metals)
8379 (radiation detecting instruments)
8532 (fiber tension analyzer)

LUBRICATION AND FRICTION

8027* The Dissipation of Frictional Heat. H. Blok. *Applied Scientific Research*, v. 5, sec. A, nos. 2-3, 1955, p. 151-181.

Factors entering problems involving rubbing surfaces. Diagram, graphs. 36 ref.

8028* Oil Whirl in Bearings. Theoretical Deduction of a Further Criterion. A. Cameron. *Engineering*, v. 179, Feb. 25, 1955, p. 237-239.

Analysis of causes of instability of shafts at high rotational speeds. Diagrams, graph. 8 ref.

8029* Whirling of a Journal Bearing. Experiments Under No-Load Conditions. G. S. A. Shawki. *Engineering*, v. 179, Feb. 25, 1955, p. 243-246.

Study of factors causing vibrations in hydrodynamically lubricated journal bearings. Photographs, diagrams, graph. 7 ref.

8030* Evaluation of Operating Oils. **Beurteilung von Betriebsölen nach neueren Erkenntnissen.** (German.) F. Eisenstecken. *Erdöl und Kohle*, v. 8, no. 2, Feb. 1955, p. 75-81.

Determination of aging, resin content, and the aging factor, with consideration to the neutralization and saponification numbers. Graphs, diagrams, tables.

8031 Theory for a Slider Bearing With a Convex Pad Surface; Side Flow Neglected. Stanley Abramovitz. *Franklin Institute, Journal*, v. 259, Mar. 1955, p. 221-233.

The effect of pad-surface curvature on load capacity, center of pressure, and fluid friction is determined using Reynolds' differential equation in hydrodynamic lubrication theory. Diagrams, graphs. 6 ref.

8032* Empirical Methods Developed to Forecast Life of Self-Enclosed, Grease-Lubricated Ball Bearings. Harry D. Martin and Peter J. Baker. *General Motors Engineering Journal*, v. 2, Mar.-Apr. 1955, p. 16-21.

Effects of speed, load, and temperature. Diagrams, tables, graphs.

8033 Oil Streamlines in Bearings. C. F. Kettleborough. *Journal of Applied Mechanics*, v. 22, Mar. 1955, p. 8-10.

Semigraphical method for tracing oil flow. Graphs.

8034* Rheological Properties of Hydrocarbon Lubricants and Congealed Oils. **O reologicheskikh svoistvakh uglevodorodnykh smazok i zastyvshikh masel.** (Russian.) V. G. Lebedev and G. V. Vinogradov. *Kolloidnyi Zhurnal*, v. 17, no. 1, Jan.-Feb. 1955, p. 38-45.

Viscosity from −40 to 50 C. Relation of momentary elastic deformation to shear stresses. Table, graphs. 5 ref.

8035 Practical Design Applications for Hydrostatic Lubrication. T. L. Corey and E. M. Kipp. *Machine Design*, v. 27, Mar. 1955, p. 189-196.

Straight forward analysis methods give impressive results in service. Diagrams, photographs, tables, graph. 8 ref.

8036* Surface Smoothness and Clearance of Bearings Operated With Full Lubrication. **Flateglatthet og pasningsnøyaktighet ved halslager som skal gå med fullsmøring.** (Norwegian. Leif Sølsnoes. *Teknisk Ukeblad*, v. 102, no. 9, Mar. 3, 1955, p. 187-191.

Effect of rate of rotation and other factors on coefficient of friction. Diagrams, graphs.

8037* Temperature Criterion for the Estimation of the Lubricating Capacity of Oils. **Temperaturnyi kriterii otsenki smazochnoi sposobnosti masel.** (Russian.) M. M. Khrushchov and R. M. Matveevskii. *Vestnik Akademii Nauk SSSR*, v. 25, no. 2, Feb. 1955, p. 47-50.

Testing device and techniques for determining coefficients of friction and temperature, and viscosity. Special polar additives. Diagram, graphs.

Books and Miscellaneous Publications

8038 Lubrication of Industrial and Marine Machinery. William Gordon Forbes. 2nd Ed. (Revised by C. L. Pope and W. T. Everitt.) 351 p. 1954. John Wiley & Sons, New York. (TJ1075 F74L2)

Selection, application, and control of lubricants and lubricating devices.

MECHANICAL ENGINEERING

8039 Theories on Bourdon Tubes. F. B. Jennings. *American Society of Mechanical Engineers, Paper No.* 54–A-168, 1954, 15 p. + 2 plates. (TJ1 Am35p)

Curves useful in designing Bourdon tubes of flat-oval, elliptical or pointed-arc cross section. Diagrams, graphs. 4 ref.

8040* Mechanical Seals. I. A Survey of Present-Day Practice. B. G. Williams. *Chemical & Process Engineering*, v. 36, Mar. 1955, p. 73-78.

Types and applications. Diagrams. (To be continued.)

8041 Pumps—With No Moving Parts. Glenn Murphy. *Consulting Engineer*, v. 5, Mar. 1955, p. 34-37, 78.

Conduction- and induction-type electromagnetic pumps for liquid metals. Photographs, diagrams, graphs. 7 ref.

8042 The Energy Theorems of Structural Analysis. I. Definitions and Fundamentals. II. Derivation and Discussion of the Theorems. E. H. Brown. *Engineering*, v. 179, Mar. 11, 1955, p. 305-308; Mar. 18, 1955, p. 339-342.

Study of the various theorems of strain energy and complementary energy, with their physical meanings, conditions, and limitations. Considers structures with either linear or nonlinear load/displacement curves. Graphs. 13 ref. (To be continued.)

8043 Propagation of Elastic Impact in Beams in Bending. Martin Goland, P. D. Wickersham, and M. A. Dengler. *Journal of Applied Mechanics*, v. 22, Mar. 1955, p. 1-7.

Experimental and theoretical analysis of transverse impact. Graphs, diagram, table. 9 ref.

8044 Plastic-Rigid Analysis of a Special Class of Problems Involving Beams Subject to Dynamic Transverse Loading. Margaret F. Conroy. *Journal of Applied Mechanics*, v. 22, Mar. 1955, p. 48-52.

Includes graphs, table. 8 ref.

8045 The Stress Problem of Vibrating Compressor Blades. Jan R. Schnittger. *Journal of Applied Mechanics*, v. 22, Mar. 1955, p. 57-64.

Simplified analysis for compressor and turbine blades. Diagram, graphs, tables. 10 ref.

8046 Anisotropic Loading Functions for Combined Stresses in the Plastic Range. L. W. Hu and Joseph Marin. *Journal of Applied Mechanics*, v. 22, Mar. 1955, p. 77-85.

Validity of loading functions for 24S-T in biaxial tension. Diagrams, graphs, table. 20 ref.

8047 A Refinement of the Theory of Buckling of Rings Under Uniform Pressure. A. P. Boresi. *Journal of Applied Mechanics*, v. 22, Mar. 1955, p. 95-102.

Effects of finite thickness on buckling coefficients. Diagrams, graphs, tables. 10 ref.

8048 Mechanical Adjustable-Speed Drives. I. Leo F. Spector. *Machine Design*, v. 27, Apr. 1955, p. 168-199.

Basic information needed for selection of drives for various applications. Photographs, diagrams, tables, graphs.

8049 Application of Dynamic Vibration Absorber to Vehicles. James C. Settles. *Ohio State University, Engineering Experiment Station, Bulletin No.* 155, v. 24, no. 1, Mar. 1955, 84 p. (TA21 03b)

Possibilities of controlling linear and rotational motions of a vehicle under varying conditions of load and speed. Diagrams, graphs, tables. 14 ref.

8050 Dynamic Loading Compression Springs. Karl W. Maier. *Product Engineering*, v. 26, Mar. 1955, p. 162-174.

Determination of vibration frequencies, stresses, and deflections. Diagrams, graphs, photograph, table.

8051* The Plastic Indentation of a Layer by a Flat Punch. R. T. Shield. *Quarterly of Applied Mathematics*, v. 13, Apr. 1955, p. 27-46.

Upper and lower bounds for the average pressure in the indentation were obtained by the application of the limit-design theorems. Diagrams, graphs. 7 ref.

8052 The Conjugate Load Method in Structural Analysis. W. L. Schwalbe. *Royal Aeronautical Society, Journal*, v. 59, Mar. 1955, p. 199-208.

Stress analysis by applying a system of loads to a single member so that its behavior, as an isolated member, is identical to its behavior as an integral part of the structure. Graphs, tables, diagrams. 5 ref.

8053* Selection of Correction for Gear Transmissions. **Podbor korrektsii zubchatykh peredach.** (Russian.) M. B. Groman. *Vestnik Mashinostroeniia*, v. 35, no. 2, Feb. 1955, p. 3-13.

Factors involved in operation of transmissions, and their influence on method of correction. Graphs, diagrams. 8 ref.

Books and Miscellaneous Publications

8054 A Treatise on Applied Hydraulics. Herbert Addison. 4th Rev. Ed. 724 p. 1954. John Wiley & Sons, New York. (TC160 Ad25t4)

Static and dynamic considerations; practical applications.

8055 Handbook of Hydraulics. Horace Williams King. 4th Ed. (Revised by Ernest F. Brater.) Sections individually paged. 1954. McGraw-Hill, New York. (TC160 K85h4)

Reference giving the basic formulas, tables, and data used in hydraulic engineering.

8056 Analysis of Statically Indeterminate Structures. John I. Parcel and Robert B. B. Moorman. 571 p. 1955. John Wiley & Sons, New York. (TG260 P21a)

Basic theory and practical authoritative coverage of the problems facing structural engineers.

8057 Industrial Design. Harold Van Doren. 2nd Ed. 379 p. 1954. McGraw-Hill, New York. (T345 V28i2)

Describes means of gathering pertinent information and of organizing it into usable form, together with the measures necessary to carry a project through to a successful and practical conclusion.

See also:

7922 (oscillation of structural beams)
8263 (stress analysis)
8264 (photoelasticity in high-pressure equipment)

METALLURGY

8058 Titanium Reference Sheet. I. G. E. Hutchinson. *Chemical Engineering Progress*, v. 51, Mar. 1955, p. 34.

Data on Rem-Cru products.

8059 What the Future Holds for Titanium. H. H. Kellogg. *Engineering and Mining Journal*, v. 156, Apr. 1955, p. 72-84.

Uses will be limited to those where wt. saving, heat resistance, or corrosion resistance justify the extra cost. Tables, flow diagram.

8060 Titanium in Cast Iron. George F. Comstock. *Foundry*, v. 83, Apr. 1955, p. 118-123.

Effect of Ti on micro-structure, mechanical properties, machinability, and corrosion resistance. Photographs, micrographs, tables. 29 ref.

8061* Effect of Si, Cu, Zn, and Mg on Cracking, Flowability, and Strength Properties of Cast Alloy G A1Si6Cu3. **Einfluss der Elemente Silizium, Kupfer, Zink und Magnesium auf Warmrissneigung, Formfüllungsvermögen und Festigkeitseigenschaften der Gusslegierung G A1Si6Cu3.** (German.) Eduard Bertram, Wilhelm Patterson, and Rudolf Kümmerle. *Giesserei*, v. 42, no. 5, Mar. 3, 1955, p. 97-102.

Casting characteristics and mechanical properties; effects of foundry variables. Graphs, table, diagrams, photograph. 4 ref.

8062 The Production of Light-Alloy Drop-Forgings, Their Heat-Treatment, Inspection, and Testing. W. T. Edmunds and R. C. Lloyd. *Institute of Metals, Journal*, v. 83, Feb. 1955, p. 247-261 + 2 plates.

Comparison of different types of Al alloy forging stock; effects of heat treatment; methods of inspection and types of defects; relationship between macro-structure, micro-structure, and mechanical properties of forgings. Tables, graphs, diagrams, photographs, micrographs. 7 ref.

8063 The Heat-Treatment, Inspection, and Testing of Wrought Nickel and Nickel Alloys. W. Betteridge and T. E. Cound. *Institute of Metals, Journal*, v. 83, Feb. 1955, p. 262-270 + 2 plates.

Processing procedures; inspection methods; process testing. Tables, micrographs, photographs. 14 ref.

8064 The Choice and Construction of Monolithic Linings for Twin-Bath Induction Furnaces for Melting Aluminium Alloys. E. J. Thackwell. *Institute of Metals, Journal*, v. 83, Feb. 1955, p. 283-294 + 1 plate.

Development of a densely rammed, fully monolithic lining, formed and fired *in situ*. Diagrams, graph, photograph.

8065 The Use of Refractories in Low-Frequency Induction Furnaces for Melting Copper Alloys. Maurice Cook, C. L. M. Cowley, and E. R. Broadfield. *Institute of Metals, Journal*, v. 83, Feb. 1955, p. 295-305 + 4 plates.

Advantages of melting in induction furnaces and features of furnace design, and operations which affect the use of refractories. Diagrams, tables, photographs, graphs. 5 ref.

8066 Aluminium-Copper-Cadmium Sheet Alloys. H. K. Hardy. *Institute of Metals, Journal*, v. 83, Mar. 1955, p. 337-346 + 1 plate.

Mechanical, corrosion, and fabricating properties. Tables, micrographs, graphs. 29 ref.

8067 Austenitic Manganese Steel. Properties and Uses. T. H. Arnold. *Iron & Steel*, v. 28, Mar. 1955, p. 95-97.

Mechanical properties, heat treatment, structure, and applications. Micrographs.

8068 Titanium Fills Need for Super Material in Aircraft of the Future. N. E. Promisel. *Journal of Metals*, v. 7, Mar. 1955, p. 443-448.

Review of properties, applications, production statistics, and future possibilities. Photographs, graphs, table. 2 ref.

8069 Unit Weights of Metals. George Sorkin and Willard H. Hawley, Jr. *Machine Design*, v. 27, Mar. 1955, p. 205-207.

Data sheet covering more than 240 types of ferrous and nonferrous metals.

8070 Rhenium Metal. Chester T. Sims. *Materials & Methods*, v. 41, Mar. 1955, p. 109-111.

With development of suitable fabricating techniques, the interesting physical, mechanical, chemical, and electronic properties of this new metal are now being exploited. Production methods, properties, fabrication procedures, and applications are described. Photographs, graph, table. 6 ref.

Metallurgy

8071 Materials Engineering File Facts. Cast Stainless Steels. *Materials & Methods*, v. 41, Mar. 1955, p. 139, 141, 143.

Mechanical, physical, corrosion, and fabricating properties; applications.

8072 Processing Aluminium Scrap. Herbert Capitaine. *Metal Industry*, v. 86, Feb. 25, 1955, p. 145-146.

Sorting; classification; melting furnaces. Tables. 2 ref.

8073* The Use of Beryllium in Light Metals. **Die Verwendung von Beryllium bei Leichtmetallen.** (German.) E. A. Smith, Jr. and E. A. Giessen. *Metall*, v. 9, nos. 5-6, Mar. 1955, p. 198-199.

Beneficial effects on properties of Al alloys and Al dip coatings on steel and other Fe alloys. Photograph, graph. 7 ref.

8074 The Properties of a High-Manganese Austenitic Stainless Steel. G. N. Flint and L. H. Toft. *Metallurgia*, v. 51, no. 305, Mar. 1955, p. 125-129.

Although in some media the corrosion-resisting properties of a stainless steel containing 18% Cr, 10% Mn, 2% Ni, stabilized with Ti, are equal to those of a Ti-stabilized 18-8 Cr-Ni steel, there are many industrial applications for which the high-Mn steel would not be suitable. The ductility and deep-drawing properties of the high-Mn steel are inferior to those of the 18-8-Ti type. Tables, photographs, micrographs. 3 ref.

8075* High Strength Cast Irons Without Special Elements. **Les fontes résistantes exemptes d'éléments spéciaux. I.** Technical Factors of the Problem. **Les facteurs techniques du problème.** (French.) J. Pascal. *Métallurgie et la construction mécanique*, v. 87, no. 2, Feb. 1955, p. 95-97, 99, 101.

Foundry techniques for making high-strength castings. (To be continued.)

8076* Studies of Ni-Cu, Cr-Cu, and Ni-Cr-Cu Steels With Structural Hardening. **Etudes des aciers Ni-Cu, Cr-Cu et Ni-Cr-Cu à durcissement structural.** (French.) H. Laplanche. *Métallurgie et la construction mécanique*, v. 87, no. 2, Feb. 1955, p. 107 + 7 pages.

Structures, transformations, corrosion resistance, and mechanical properties of Cu bearing steels. Diagrams, graphs, tables. 22 ref.

8077 History of Gun Tubes. III. Steel for Cannon. Peter R. Kosting. *Metal Progress*, v. 67, Apr. 1955, p. 109 + 12 pages.

Comparison of cast iron vs. steel tubes. Transition era of cast iron to steel. Modern development of steel guns. Diagrams, tables. 27 ref.

8078 A New Toolsteel of High Cutting Capacity. (Digest of "Contribution to the Study of 'Rollodur', a Steel of High Cutting Capacity", by Albert Collaud; *Von Roll Mitteilungen*, v. 11, July-Dec. 1952, p. 73-91.) *Metal Progress*, v. 67, Apr. 1955, p. 152, 154-156.

Development of high-Cr alloys as a substitute for W high speed steels.

8079 A Dictionary of Metallurgy. A. D. Merriman and J. S. Bowden. *Metal Treatment and Drop Forging*, v. 22, Mar. 1955, p. 105-111.

Defines "petzite" to "pigging back". Diagrams, tables. (To be continued.)

8080* High Strength "ALS" Steels for Light Construction. **Les aciers "ALS" à haute résistance pour constructions légères.** (French.) Aldo Bartocci. *Métaux, Corrosion-Industries*, v. 30, no. 353, Jan. 1955, p. 18-33.

Properties and applications of new Italian low alloy steels. Tables, micrographs, graphs, photographs.

8081* Scientific Knowledge of Metals. **Connaissance scientifique des métaux.** (French and German.) Th. Zürrer. *Pro-Metal*, v. 7, no. 43, Feb. 1955, p. 456-467.

Compositions and properties of various bronzes and German Ag. Graphs, diagram, tables, photographs. 3 ref.

8082* **Titanium—1954-55, an Inventory of Progress.** C. I. Bradford. *Rem-Cru Titanium Review*, v. 3, Jan. 1955, p. 1-3.

New aircraft and ordnance uses of the metal.

8083 Role of Liquid Metals in Nuclear Power Development. J. W. Taylor. *Research*, v. 8, Mar. 1955, p. 102-105.

Potential applications as coolants and heat transfer media, carriers for nuclear fuel, and extraction agents in processing spent fuel. Table.

8084 Chromium-Base Alloys. R. G. Nelson and H. G. Anderson. *U. S. Bureau of Mines, Report of Investigations* 5107, Jan. 1955, 20 p. (TN21 Un3r)

Development of Cr-rich alloys for high-temperature uses with high-purity Cr produced by a H-treatment method. Tables, graph, photographs, micrographs.

8085* Titanium: Properties, Uses, and Methods of Producing It. **Titan, svoistva, primenenie i metody ego polucheniia.** (Russian.) I. I. Kornilov. *Uspekhi Khimii*, v. 23, no. 5, 1954, p. 529-546.

Survey of work, including the author's own recent contributions. Tables, graphs, diagrams. 37 ref.

Books and Miscellaneous Publications

8086 Titanium in Industry. Stanley Abkowitz, John J. Burke, and Ralph H. Hiltz, Jr. 224 p. 1955. D. Van Nostrand Co., New York. (TN799.T5 Ab62t)

The production, properties, and processing of Ti and its alloys; extracting procedures; heat treatment; working, analytical, and metallographic techniques.

8087 Metallurgy of the Non-Ferrous Metals. W. H. Dennis. 647 p. 1954. Pitman Publishing Co., New York. (TN758 D42m)

Extractive metallurgy with brief references to properties and applications.

8088 Fundamentals of Physical Metallurgy. Ralph Hultgren. 395 p. 1952. Prentice-Hall, New York. (TN690 H87f)

Principles as they apply to all alloys, with each theory clarified by a practical example.

8089 Magnesium Design Notes. 136 p. 1954. Dow Chemical Co., Midland, Michigan. (TN799.M2 D75md)

Mechanical, physical, and fabricating properties. Stability of treated surfaces.

8090 Competition Between Steel and Aluminium. Economic Commission for Europe Steel Committee. 156 p. 1954. Sales Section, European Office of the United Nations, Palais des Nations, Geneva, Switzerland. (HD9525 Un2.2c)

Trends in production and trade; prices and costs; applications in various industries.

8091 Watkins Cyclopedia of the Steel Industry. 5th Ed. 485 p. 1955. Steel Publications, Pittsburgh. (TN705 W32)

Reference book on the activities of the steel producing and processing industries.

8092 International Congress on Electrothermics. 3rd, Paris, 1953. **Der III. Internationale Elektrowärme-Kongress, Paris und die Elektrowärme-Tagung, Essen.** (German.) 138 p. Vulkan Verlag Dr. W. Classen, Essen, Germany. (TK4601 In8i)

Collecton of papers on electric heating in the metallurgical industry including melting, heat treating, sintering, and processing.

See also:

8378 (metallurgy of uranium)

METALS—EXTRACTION AND REFINING

8093 Acid Electric Steelmaking Practice. C. C. Wissmann. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint*, 1954, 13 p. (TN706 EL25p)

Problems in determining extent and nature of oxidation reactions. Graphs, table. 8 ref.

8094 Application of Special Elements to Electric Furnace Steels. A. J. Scheid, Jr. and W. J. Mathews. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint*, 1954, 8 p. (TN706 EL25p)

Effects of various additives on quality of steel.

8095 Basic Electric Melting Practice for Quality Steel. A. F. Gross. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint*, 1954, 16 p. (TN706 EL25p)

Effects of melting practice variables on properties of steel. Photographs, graphs, tables.

8096 The Effect of Intermittant Operation on Electric Furnace Refractories. R. P. Hill. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint*, 1954, 1 p. (TN706 EL25p)

Practices for returning idle furnaces into production.

8097 Use of Reusable Insulated Low-Volume C&D Hot Tops for Yield Improvement. Joel C. Carpenter. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint*, 1954, 4 p. (TN706 EL25p)

Advantages of reusable hot tops. Graphs.

8098* Open Hearth Operation and Control. The Use of Instrumentation. G. Reginald Bashforth. *British Steelmaker*, v. 21, Mar. 1955, p. 80-86.

Instruments for control of furnace pressure, combustion, regenerator temperature, and roof temperature. Diagrams, graphs, table. 18 ref.

8099 The Production of Ferromanganese. V. P. Elyutin, Yu. A. Pavlov, and B. E. Levin. *Henry Brutcher Translation No.* 3436, 27 p. (Part from Book "The Production of Ferroalloys", Chap. V. 1951. Metallurgizdat, Moscow.) Henry Brutcher, Altadena, Calif.

Survey of production methods for various grades; other products. Tables, graphs. 3 ref.

8100 Practical Experiences With Continuous D. C. Casting of Light-Metal Alloys. K. E. Mann. *Henry Brutcher Translation No.* 3463, 21 p. (From *Aluminium*, v. 29, no. 12, 1953, p. 497-508.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 5211, v. 3, Apr. 1954.

8101 Investigations Into the Aluminothermy of Aluminum. K. Giesen and W. Dautzenberg. *Henry Brutcher Translation No.* 3464, 11 p. (Slightly condensed from *Archiv für Metallkunde*, v. 2, no. 2, 1948, p. 49-53.) Henry Brutcher, Altadena, Calif.

Effect of oxidation state of Mn; quantity and particle size of Al serving as reductant; composition of slag; and furnace size upon yield and purity of Mn metal obtainable by aluminothermy. Tables, graphs, diagram. 7 ref.

8102 Extraction of Uranium From Ore Concentrate. H. Chr. Neeb and K. Stokland. *Henry Brutcher Translation No.* 3474, 19 p. (From *Forsvarets Forsknings, Institutt Arbok III*, 1950-1951, p. 3-16.) Henry Brutcher, Altadena, Calif.

Plant design; processing steps. Diagrams.

8103 Refining Bismuth by Distillation and Chlorination. R. R. Rogers and R. A. Campbell. *Canadian Mining and Metallurgical Bulletin*, v. 48, no. 515, Mar. 1955, p. 121-123; disc., p. 123-126; *Canadian Institute of Mining and Metallurgy, Transactions*, v. 58, 1955, p. 71-76.

Laboratory procedures and results. Diagrams, tables, graphs. 10 ref.

8104* Tests With Cowper Apparatuses. **Essais d'appareils Cowper.** (French.) D. Sanna. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques*, v. 12, no. 2, 1955, p. 345-382.

Lengthy study of tests to study accumulation of heat, charge losses, and heat transfer in blast furnace stoves. Tables, graphs.

8105* Report of Heat-Accumulation Tests Conducted at the Louvroil Factory on a D. Petit Cowper. **Compte rendu des essais d'accumulation de chaleur réalisés à l'usine de Louvroil sur un cowper D. Petit.** (French.) Moutot. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques*, v. 12, no. 2, 1955, p. 383-401.

Effects of various operating conditions. Diagrams, tables, graphs.

8106 The Extraction and Purification of Scandium. R. C. Vickery. *Chemical Society, Journal*, 1955, Jan., p. 245-251.

Crude is extracted from wolframite and thortveitite and refined by ion exchange. Hydrazine-*NN'*-diacetate solution is selective for Sc. Graphs, chromatograms. 20 ref.

8107* Determination of the Activities of Copper and Gold in Their Alloys. **Détermination des activités du cuivre et de l'or dans leurs alliages.** (French.) Daniel Balesdent. *Comptes rendus*, v. 240, no. 7, Feb. 14, 1955, p. 760-762.

Study of the reduction equilibrium of copper sulfide by H in the presence of Au. Table. 6 ref.

8108 Production of Zirconium Alloys by Consumable Electrode Arc Melting. R. A. Beall, J. O. Borg, and H. L. Gilbert. *Electrochemical Society, Journal*, v. 102, Apr. 1955, p. 187-192.

Equipment and conditions of operation involved in double melting; discussion of homogeneity, purity, and effective yield. Diagrams, tables, photographs. 10 ref.

8109* High Gas Pressure Blast Furnaces. **Provoz vysokých pecí se zvýšeným tlakem plynu.** (Czech.) Ludvík Brož. *Hutnické Listy*, v. 10, no. 2, Feb. 1955, p. 67-73.

Pressure losses; thermal efficiency; gas distribution; quality of pig iron produced. Considers design changes necessary for blast furnaces. Diagrams, table. 8 ref.

8110* Improvements in Continuous Casting and Direct Rolling of Steel. **Postępy odlewania ciągłego i walcowania bezpośredniego stali.** (Polish.) Z. Wusatowski. *Hutnik*, v. 21, no. 11, Nov. 1954, p. 370-375.

Status of the process in Poland, Russia, and the United States. Micrographs, tables, diagrams. 36 ref.

8111* Increasing the Coefficient of the Utilization of Open-Hearth Furnace Time by Speeding-Up Periodic Repairs and Overhauling. **Zwiększenie współczynnika wykorzystania czasu pieca martenowskiego przez przyspieszenie remontów okresowych i kapitalnych.** (Polish.) Józef Szaliński. *Hutnik*, v. 21, no. 12, Dec. 1954, p. 385-390.

Classification of repairs and methods cutting-down repair time. Tables.

8112 Attempts to Improve Aluminium Reduction Since Héroult and Hall. A. von Zeerleder. *Institute of Metals, Journal*, v. 83, Mar. 1955, p. 321-328.

Surveys attempts made during the last 60-yr. to find an improved method of producing Al on a commercial scale. It is concluded that none can compete economically with the most modern version of the Hall-Héroult-Bayer process. Diagrams, tables, flowsheets.

8113* Characteristics of the Molybdenum-Depositing Arc and the Metal-Arc Melting Process. A. R. Moss. *Institution of Electrical Engineers, Proceedings*, v. 102, pt. A, no. 1, Feb. 1955, p. 45-55.

Behavior of the arc during melting in vacuum or argon atmosphere; influence of arc variables on ingot quality. Diagrams, tables, graphs, photographs. 19 ref.

8114 Oxygen Steelmaking; How Canadian Plant Uses New Process. F. J. McMulkin. *Iron Age*, v. 175, Mar. 31, 1955, p. 75-78.

Description of equipment and operating procedures; advantages of process. Characteristics of steel produced. Graphs, diagram, photograph.

8115 Economic Aspects of the Oxygen Converter. W. C. Rueckel and J. W. Irvin. *Iron and Steel Engineer*, v. 32, Mar. 1955, p. 61-63; disc., p. 64-65.

Metals—Extraction and Refining

Comparison of costs of the O converter with an open-hearth furnace operation indicates a net saving through the use of the converter. Photograph, tables. 4 ref.

8116 Ferro-Manganese Additions in Open Hearth Steelmaking. Rudolph Tietig, Jr. *Iron and Steel Engineer*, v. 32, Mar. 1955, p. 82-86; disc., p. 86-89.

Controlled addition of Mn at proper point in ladle accomplished by mechanical feeder should give a minimum saving in Mn cost of $0.15 per ingot ton, and for some grades of steel, reductions in cost up to $0.30 a ton. Tables, diagram, photograph.

8117 Reducibility of Iron-Ore Lumps. A. E. El-Mehairy. *Iron and Steel Institute, Journal*, v. 179, Mar. 1955, p. 219-226.

Effects of porosity on chemical reducibility. Graphs, diagrams, tables. 30 ref.

8118 An Improved Model for the Calculation of Heat Transfer in the O.H. Furnace. M. W. Thring and D. Smith. *Iron and Steel Institute, Journal*, v. 179, Mar. 1955, p. 227-230.

Model is used to calculate average roof temperature and thermal efficiency during the melting period. Diagram, table. 6 ref.

8119 The Supply of Scrap to Open-Hearth Furnaces. M. D. J. Brisby and W. O. Pendray. *Iron and Steel Institute, Journal*, v. 179, Mar. 1955, p. 252-260.

Causes and corrective procedures for charging delays. Graphs, tables.

8120 Charging Delays Due to Furnace Bunching. A Method of Assessment. R. Solt. *Iron and Steel Institute, Journal*, v. 179, Mar. 1955, p. 260-264.

Operational analysis of charging. Derives method for forecasting changing demand of furnaces. Graphs, table. 1 ref.

8121* Complex Deoxidation of Steel by Silicon and Manganese. **O kompleksnom raskislenii stali kremniem i margantsem.** (Russian.) I. S. Kulikov and A. M. Samarin. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1954, no. 10, Oct., p. 23-30.

Influence of Mn on the deoxidizing ability of Si; solid and liquid deoxidation products at temperatures of steel production. Tables, graphs. 6 ref.

8122* Influence of Moisture Content of Ore on the Process of Reduction of Iron Oxides. **Vliianie vlagi rudy na protsess vosstanovleniia okislov zheleza.** (Russian.) V. T. Bragin. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1954, no. 10, Oct., p. 31-38.

Reducibility of limonite in natural state, roasted at 550 C, and after roasting and restoration of original water content. Tables, graphs. 5 ref.

8123 Maintenance of Electric Furnace Bottoms as Practiced in Bethlehem Plant. H. C. Bigge. *Journal of Metals*, v. 7, Mar. 1955, p. 453-456.

Installation and hole-patching procedures for 96% MgO rammed bottom. Photographs, diagram, tables. 5 ref.

8124 Preparation and Arc Melting of High Purity Iron. G. W. P. Rengstorff and H. B. Goodwin. *Journal of Metals*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 203, Mar. 1955, p. 467-471.

Method is described for purifying Fe in batches of 150 lb. or more. Oxygen, C, N, and S are removed from flakes of electrolytic iron by treatment in wet and then dry H. A special consumable-electrode arc furnace is used to remove H and to melt the flakes into ingots. Diagrams, tables. 7 ref.

8125 Fuming of Zinc From Lead Blast Furnace Slag. R. C. Bell, G. H. Turner, and E. Peters. *Journal of Metals*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 203, Mar. 1955, p. 472-477.

Thermodynamic study of Zn recovery reactions. Graphs, tables. 10 ref.

8126 Activities in the Iron Oxide-Silica-Lime System. John F. Elliott. *Journal of Metals*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 203, Mar. 1955, p. 485-488.

Thermodynamic studies of behavior of phases in molten slag system. Graphs. 15 ref.

8127* Production of High-Purity Aluminum. **Nagytisztaságú alumínium gyártásáról.** (Hungarian.) Endre Balázs. *Kohászati Lapok*, v. 10, no. 1, Jan. 1955, p. 17-20.

Production methods; furnace and electrode design; advantages of applications. Diagrams, table. 6 ref.

8128* Quality Steel Production. **Minőségi acélgyártás.** (Hungarian.) Endre Szücs. *Kohászati Lapok*, v. 10, no. 2, Feb. 1955, p. 77-88.

Hungarian and Soviet experiences in the production of unkilled deepdrawing plate material. Tables. 4 ref.

8129* Past, Present, and Future in Hungarian Non-Ferrous Metallurgy. **A magyar fémkohászat multja, jelene és jövője.** (Hungarian.) László Jakóby. *Kohászati Lapok*, v. 10, no. 2, Feb. 1955, p. 91-106.

Production processes and facilities for Au, Ag, Pt, Cu, Pb, Zn, Mn, Ti, and non-ferrous scrap development. Table.

8130* Treatment of Al-13 Alloy by Potassium Fluorozirconate Under a Stream of Nitrogen. **Obrabotka splava Al-13 ftortsirkonatom kaliia s produvkoi azotom.** (Russian.) L. O. Sokolovskii and A. G. Kapalin. *Liteinoe Proizvodstvo*, 1955, no. 2, Feb., p. 10-12.

Method of producing high-strength Al-Mg alloy.

8131 Large Molybdenum Ingots by Arc Casting. Norman L. Deuble. *Metal Progress*, v. 67, Apr. 1955, p. 87-90.

Describes the manufacture of high-purity Mo powder, its continuous formation into a consumable electrode, and its arc melting in a high vacuum into half-ton ingots of theoretical density. Photographs, diagram, table.

8132* Causes of Defects in Non-Ferrous Metal Castings. **Selejtokok a fémöntödében.** (Hungarian.) László Jakóby. *Öntöde*, v. 6, no. 2, Feb. 1955, p. 32-39.

Suggestions are presented for overcoming defects resulting from casting procedures or core preparation. Diagrams, tables.

8133* Results of a Year of Research on the Low-Shaft Blast Furnace. **Résultats d'une année de recherches sur le bas fourneau.** (French.) International Steering Committee. *Revue universelle des mines*, v. 11, ser. 9, no. 2, Feb. 1955, p. 45-67.

Description of tests and discussion of results obtained. Diagrams, photographs, tables, graphs. 6 ref.

8134* Desulfurization in a Basic Converter. **Dèsulfuration en cornue basique.** (French.) J. Wampach and A. Decker. *Revue universelle des mines*, v. 11, ser. 9, no. 2, Feb. 1955, p. 68-75.

Screening of lime for use in converters; factors influencing desulfurization. Tables, graphs. 7 ref.

8135 Progress in Steelmaking. O_2 Blast Enrichment Shortens Blowing Time. *Steel*, v. 136, Mar. 21, 1955, p. 124, 127, 130.

Development and uses of O in steelmaking.

8136 Oxygen Steelmaking Arrives. Thomas F. Hruby. *Steel*, v. 136, Apr. 4, 1955, p. 80-83.

Oxygen steelmaking processes and experiences at two steel plants. Reactions in the steelmaking vessel. Future outlook for oxygen steelmaking. Photographs.

8137 Electrolytic Cell for Titanium. B. W. Whitehurst. *Steel*, v. 136, Apr. 18, 1955, p. 107.

Plated on starting wire from low temperature molten salt in which rutile or ilmenite is dissolved. Diagram.

8138* Fundamental Studies on Copper Smelting. II. Solubilities of Constituents of Matte in Slag. (English.) Akira Yazawa and Mitsuo Kameda. *Technology Reports, Tôhoku University*, v. 19, no. 1, 1954, p. 1-22.

Determination of chemical solubilities of constituents of matte. Graphs, diagrams, tables, micrographs. 20 ref.

8139* Oxygen Converter Experiences. F. H. Baer. *Western Machinery and Steel World*, v. 46, Mar. 1955, p. 100-103.

Results of 18 months experience at an Austrian steel plant. Photographs.

Books and Miscellaneous Publications

8140 Third Report of the Ingot Moulds Sub-Committee. Iron and Steel Institute Special Report No. 52. 72 p. 1955. The Iron and Steel Institute, London. (TN601 I6s)

Survey and analysis of service conditions in British steelmaking ingot practice; effects of mold composition; properties of mold metals; and design of ingot molds.

METALS—FINISHING, POLISHING, AND CLEANING

8141 Precision Barrel Finishing. Malcolm M. Maynes. *American Electroplaters' Society, Proceedings*, v. 41, 1954, p. 27-32. (TS670 Am35p)

Method of deburring and surface finishing metal parts. Photographs.

8142 Calculation of Modern Continuous Pickling Plants. W. Fackert. *Henry Brutcher Translation No.* 3431, 29 p. (Slightly abridged from *Stahl und Eisen*, v. 72, no. 20, 1952, p. 1196-1207.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 195, v. 2, Jan. 1953.

8143 Acid Pickling—A Closed-Cycle Process? W. Fackert. *Henry Brutcher Translation No.* 3432, 15 p. (Slightly abridged from *Stahl und Eisen*, v. 74, no. 14, 1954, p. 888-894.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 14473, v. 3, Oct. 1954.

8144 Instrumentation: Controlled Measurement Lowers Pickling Costs. D. H. Krouse. *Iron Age*, v. 175, Apr. 7, 1955, p. 132-134.

Measurement and control of fresh acid addition to pickling processes through the use of modern instrumentation. Diagrams.

8145 Continuous Pickling Stainless Steel. Francis F. Jaray. *Metal Finishing*, v. 53, Mar. 1955, p. 68-72.

Operating procedure of a unique British pickling plant. Photographs.

8146* Surface Preparation of Ferrous Metals. **Préparation superficielle des métaux ferreux.** (French.) J. Liger. *Métallurgie et la construction mécanique*, v. 87, no. 2, Feb. 1955, p. 119, 121-122.

Sandblasting and shot peening; surface properties after treatment.

8147* Pickling Inhibitors and Accelerators. **A propos des inhibiteurs et accélérateurs de décapage.** (French.) G. Rossi-Landi. *Métallurgie et la construction mécanique*, v. 87, no. 2, Feb. 1955, p. 125, 127.

Role of inhibitors and accelerators in chemical cleansing of steel.

8148* Cleaning and Preparation of Steel Prior to Finishing. *Stove and Appliance Builder*, v. 20, Apr. 1955, p. 72-77.

To obtain full benefit from finishing materials, correct pretreatment of steel surfaces is essential. Tables.

8149* Influence of Hydropolishing on the Properties of Steel Parts in Operation. **Vliianie obrabotki gidropolirovaniem na ekspluatatsionnye svoistva stali.** (Russian.) E. A. Satel' and M. A. Elizavetin. *Vestnik Mashinostroeniia*, v. 35, no. 2, Feb. 1955, p. 51-55.

Method, uses, and advantages of polishing by a jet of liquid with admixture of fine abrasive. Graphs, diagrams, micrographs.

8150* Chemical Polishing of Brass and German Silver. **Über das chemische Glänzen von Messing und Neusilber. III.** Chemistry of the Polishing Process. **Zur Chemie des Glänzungsvorganges.** (German.) Gerhard Schmid and Heinz Spähn. *Zeitschrift für Metallkunde*, v. 46, no. 2, Feb. 1955, p. 128-137.

Dependence of the dissolution rate and the formation of nitrous acid upon the water content; composition of gases formed during polishing; activity measurements; theory of chemical polishing. Graphs, diagram. 14 ref.

See also:

8289 (metal polishing)

METALS—FOUNDRY PRACTICE

8151 Improving Investment Casting Quality. D. G. McCullough, F. J. Webbere, and R. F. Thomson. *American Foundryman*, v. 27, Apr. 1955, p. 56-61.

Level of stress-rupture properties obtained for a Ni-Cr-Fe alloy was raised, and spread in results was decreased by gating investment cast test bars in accordance with practices determined by study of fluid flow characteristics in transparent plastic mold models. Photographs, graphs, diagrams.

8152 Risering Ductile Cast Iron. R. A. Flinn, D. J. Reese, and W. A. Spindler. *American Foundryman*, v. 27, Apr. 1955, p. 62-66.

How to calculate risering that will adequately prevent either centerline or riser-neck shrinkage. Tables, graph, radiographs, photographs. 2 ref.

8153 High-Alloy Steel Melting in the Basic Arc Furnace. Harold C. Templeton. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint*, 1954, 3 p. (TN706 EL25p)

Melting practice for stainless steel castings. Tables.

8154 Use of Basic Ladle Linings in the Foundry. K. T. Apgar. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint*, 1954, 1 p. (TN706 EL25p)

Lining practice required for Hadfield steel.

8155* Solidification Sequences and Their Significance. I. C. H. Hughes. *British Cast Iron Research Association. Journal of Research and Development*, v. 5, Feb. 1955, p. 518-536 + 4 plates.

Shrinkage characteristics of flake graphite and nodular graphite irons. Correlation of shrinkage defects. Diagrams, graphs, micrograph, photographs. 11 ref.

8156* The Solidification of Castings in Relation to Their Soundness. Microscopic and Thermal Analyses of Solidification in 2-In. Grey Iron Bars. J. H. Gittus and I. C. H. Hughes. *British Cast Iron Research Association. Journal of Research and Development*, v. 5, Feb. 1955, p. 537-554 + 10 plates.

Modes of solidification of low phosphorus flake graphite, high phosphorus flake graphite, and nodular graphite cast irons were studied of sand-cast bars quenched at various times during solidification. Table, graphs, micrographs, photographs.

8157* The Effect of Dead Clay on the Properties of Clay-Bonded Sand. W. B. Parkes and A. G. Sealey. *British Cast Iron Research Association. Journal of Research and Development*, v. 5, Feb. 1955, p. 555-562.

Tests to determine non-plastic clay by means of moisture content. Methods of controlling dead clay and neutralizing its effect. Graphs. 1 ref.

8158* The Collection of Cupola Dust. F. M. Shaw. *British Cast Iron Research Association. Journal of Research and Development*, v. 5, Feb. 1955, p. 563-592.

Characteristics of cupola dust and dust collectors. Tables, diagrams, graphs. 32 ref.

8159 Cupola With Oxygen-Enriched Blast. V. N. Filippov. *Henry Brutcher Translation No.* 3429, 3 p. (From *Liteinoe Proizvodstvo*, 1952, no. 5, p. 27.) Henry Brutcher, Altadena, Calif.

Procedures for treating cupola iron with O; effects on mechanical properties of cast iron. Diagrams.

8160 Battery of Timers Controls Cycle Sequence. Otto W. Winter and Frank B. Hall. *Electrical Manufacturing*, v. 55, Mar. 1955, p. 110-117.

Metals—Foundry Practice

Synchronous timers permit automation of shell molding machine. Photographs, diagrams, circuit diagrams.

8161 Steel Penetration. R. C. Emmons and Jack Bach. *Foundry*, v. 83, Apr. 1955, p. 108-116.

Causes; mechanism of action; corrective measures. Micrographs, photographs, graphs, tables, diagrams. 2 ref.

8162 Melt-Quality Tests for Copper-Base Alloys. A. R. French. *Foundry Trade Journal*, v. 98, Mar. 10, 1955, p. 253-257; Mar. 17, 1955, p. 281-293.

Types of prepouring tests; evaluation of test results from the standpoint of service properties desired and metallurgical characteristics. Photographs, micrographs, diagrams, tables. 16 ref.

8163 Defects in Steel Castings. R. A. Boustred. *Foundry Trade Journal*, v. 98, Mar. 24, 1955, p. 311-319.

Causes and remedies for blowholes, pinholes, shrinkage defects, scabs, and other casting defects. Photographs, micrographs, table.

8164* The Layering Process, a Means for Determining the Casting Method and Casting Rate for Steel. **Das Schichtverfahren, ein Hilfsmittel zur Bestimmung der Giessweise und der Giessgeschwindigkeit für Stahl.** (German.) Sten Forslund. *Giesserei*, v. 42, no. 4, Feb. 17, 1955, p. 73-81.

Processes of movement at the metal front; processes during cold casting. Details and advantages of the layering process. Photographs, diagrams, graphs.

8165* Chemical Attacks of the Melting and Fluxing Agents as Well as of the Metals on the Graphite Crucible. **Chemische Angriffe der Schmelz- und Flussmittel sowie der Metalle auf den Graphitschmelztiegel.** (German.) Elisabeth Lotze. *Giesserei*, v. 42, no. 4, Feb. 17, 1955, p. 85-88.

Observations on various attacks; examples of crucible defects; practical suggestions. Photographs.

8166* Melting With Inert Coke. **Schmlzen mit reaktionstragem Koks.** (German.) Wilhelm Heinrichs. *Giesserei*, v. 42, no. 5, Mar. 3, 1955, p. 102-106.

Advantages of melting with high-carbon coke. Tables, graphs, micrographs. 3 ref.

8167* Segregation in Heavy-Metal Casting. **Die Seigerung bei Schwermetallguss.** (German.) Rudolf Rövenstrunk. *Giesserei*, v. 42, no. 5, Mar. 3, 1955, p. 111-112.

Causes and prevention of segregation in Pb alloy castings. Diagrams.

8168* Casting Defects and Their Causes. **Gjutgodsfel och deras orsaker. VII.** Mold Wall Analysis. **Formväggsanalys.** (Swedish.) *Gjuteriet*, v. 45, no. 2, Feb. 1955, p. 17-21.

Properties of mold walls and factors controlling them. Tables. 13 ref.

8169* Dephosphorization of Cast Iron by the Addition of Mg, Ca, and Ce Under Reducing Conditions. **Avfosforering av gjutjärn med Mg, Ca och Ce under reducerande förhållanden.** (Swedish.) G. Östberg. *Gjuteriet*, v. 45, no. 2, Feb. 1955, p. 24-25.

Theoretical and practical aspects of the process which currently seems to be practical for dephosphorization of ferro alloys. Table. 8 ref.

8170 Some Uses of Silica Sols in Precision Investment Casting. D. J. Cloherty and H. G. Emblem. *Industrial Chemist and Chemical Manufacturer*, v. 31, Mar. 1955, p. 111-114.

Seeks replacements for the flammable ethyl silicate binder. Tables, diagram. 14 ref.

8171* Hydrodynamic Theory of Horizontal Centrifugal Casting. **Gidrodinamicheskaia teoriia gorizontal'nogo tsentrobezhnogo lit'ia.** (Russian.) B. F. Vilium. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1954, no. 10, Oct., p. 39-46.

Mathematical solution of flow of molten metal during centrifugal casting. Diagrams, table. 2 ref.

8172* Casting of Complex Machine Parts Using Magnesium Cast Iron. **Otlivka slozhnykh detalei iz magnievogo chuguna.** (Russian.) V. I. Soldatenko, M. I. Rotenberg, and V. M. Iangunaev. *Liteinoe Proizvodstvo*, 1955, no. 2, Feb., p. 5-6.

Method of alloying and casting. Table, micrographs.

8173* Peculiarities in Production of Magnesium Cast Iron. **Osobennosti polucheniia magnievogo chuguna.** (Russian.) V. A. Zakharov. *Liteinoe Proizvodstvo*, 1955, no. 2, Feb., p. 14-16.

Experimental investigation of the influence of Mg on C content, form of residual graphite, and general metallographic structure. Tables, micrographs. 2 ref.

8174* **Aluminium Melting Furnaces.** Herbert Capitaine. *Metal Industry*, v. 86, Feb. 18, 1955, p. 125-127.

Factors to be considered is selecting the size and type of furnace. Diagrams. 3 ref.

8175* Small Converter for the Steel Foundry. **Le petit convertisseur en aciérie de moulage.** (French.) Marcel Guédras. *Métallurgie et la construction mécanique*, v. 87, no. 2, Feb. 1955, p. 103-104.

Economic advantages of the side-blown Bessemer over the electric furnace. Graph.

8176* Metal Penetration Into the Material of the Mold. **Fémbehatolás a forma anyagába.** (Hungarian.) Zoltán Nagy. *Öntöde*, v. 6, no. 1, Jan. 1955, p. 7-12.

Investigations to eliminate defects caused by the sand burning on the casting. Diagrams, graphs, tables. 8 ref.

8177 Shell Molding for Short-Run Production. Frank K. Shallenberger. *Product Engineering*, v. 26, Mar. 1955, p. 175-179.

Advantages and applicability of the process; 12 specific guides to minimum piece cost. Photographs, table.

8178* Industrial Production of Spheroidal Cast Iron at High Pressure. **Provozní výroba tvárné litiny pod tlakem.** (Czech.) Vlastislav Otáhal. *Slévárenství*, v. 3, no. 1, Jan. 1955, p. 2-6.

Use of 4.5 to 5.5 atmospheres reduces amount of Mg required for innoculation. Graphs, photographs, diagram. 13 ref.

8179* Mechanization of Permanent Mold Casting of Gray Iron. **Mechanisace odlévání šedé litiny do kokilových forem.** (Czech.) Karel Mlčoch. *Slévárenství*, v. 3, no. 1, Jan. 1955, p. 6-9.

Automatic rotating machine reduces costs by as much as 25%. Photographs. 6 ref.

8180* Production of Spheroidal Cast Iron at the V. M. Molotov Works in Třinec. **Výroba tvárné litiny v Železárnách V. M. Molotova v Třinci.** (Czech.) Miloš Stárek. *Slévárenství*, v. 3, no. 2, Feb. 1955, p. 36-41.

Controlled cast iron melting, for Mg inoculation, results in the production of the heaviest spheroidal Fe casting possessing good structure and mechanical properties. Micrographs, tables, diagram, photograph.

8181* Centrifugal Casting of Tubular Steel Castings. **Odstředivé odlévání ocelových trubkových těles.** (Czech.) František Wiesner. *Slévárenství*, v. 3, no. 2, Feb. 1955, p. 44-47.

Several methods and theories are given and various types of centrifugal machines, with horizontal or vertical rotational axis are described. Diagrams, table, graph. 4 ref.

8182* Hydrometer Method Determines Clay Content of Foundry Sands. **Hustoměrná metoda určení obsahu hlíny ve slévárenských píscích.** (Czech.) Jiří Ornst. *Slévárenství*, v. 3, no. 1; *Práce Československého Výzkumu Slévárenského*, v. 2, no. 14, Jan. 1955, p. 101-106.

Simple method evaluates sand mixtures in about 15 min. but does not replace standard method for precise determinations. Graphs, tables. 17 ref.

8183* Gases in Cast Iron. **Gasser i støpejern.** (Norwegian.) Edgar Bull Simonsen. *Tidsskrift for Kjemi, Bergvesen og Metallurgi*, v. 15, no. 1, 1955, p. 6-12.

Investigates effects of H, O, and N. Tables, graph. 22 ref.

8184 Dephosphorization in a Side-Blown Basic Converter. R. C. Buehl and M. B. Royer. *U. S. Bureau of Mines, Report of Investigations* 5102, Feb. 1955, 20 p. (TN21 Un3r)

Modification of side-blown basic-lined converter and operating procedures for dephosphorizing a high Mn slag. Photographs, diagrams, tables. 8 ref.

8185* Shell Molding. Curtis L. Graversen. *Western Machinery and Steel World*, v. 46, Mar. 1955, p. 84-87.

Basic principles; advantages and disadvantages; typical applications; future possibilities. Photographs.

8186* Technical Testing of Pressure Castings. **Technische Prüfung von Druckgussteilen.** (German.) Gustav Lieby. *Zeitschrift für Metallkunde*, v. 46, no. 2, Feb. 1955, p. 137-146.

Quality control; use of various testing procedures. Diagrams, photographs. 10 ref.

METALS—HEAT TREATMENT

8187 Electrical Control for Continuous Annealing Line. P. A. Travisano. *Blast Furnace and Steel Plant*, v. 43, Mar. 1955, p. 305-309, 314.

Details of equipment for handling up to 30 tons per hr. of light gage steel strip. Photographs, diagrams.

8188* The Overheating of Steel. **La surchauffe de l'acier.** (French.) Remy. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques*, v. 12, no. 2, 1955, p. 407-429.

Methods of detecting overheating, its causes, and influence on mechanical properties. Photograph, micrographs, graphs. 42 ref.

8189* Quantitative Study of the Kinetics of Cooling Nickel Specimens During High Speed Quenching in Different Liquids. **Étude quantitative de la cinétique de refroidissement d'échantillons de nickel au cours de leur hypertrempe dans différents liquides.** (French.) Roland Bigot and René Faivre. *Comptes rendus*, v. 240, no. 7, Feb. 14, 1955, p. 774-775.

Cooling rates in Hg, petroleum, distilled water, and brine. Cooling curves are plotted. Graphs. 8 ref.

8190* Patenting of Steel Wire Heated Directly by Electric Current. **Patentowanie drutu stalowego nagrzewanego bezpośrednio prądem elektrycznym.** (Polish.) Julian Lasota. *Hutnik*, v. 21, no. 11, Nov. 1954, p. 352-356.

Laboratory equipment and advantages of the process. Tables, graphs, diagram, micrographs. 4 ref.

8191 Heat-Treatment and Finishing Operations in the Production of Copper and Aluminium Rod and Wire. H. J. Miller. *Institute of Metals, Journal*, v. 83, Feb. 1955, p. 221-232 + 1 plate.

Annealing and heat-treatment operations. Review of factors determining surface quality of wires. Table, graphs, micrograph, photographs. 17 ref.

8192 Short Cycle Anneal Restores Ductility in Cold Extrusions. C. A. Turner, Jr. *Iron Age*, v. 175, Mar. 10, 1955, p. 96-99.

Description of equipment and operating procedures for fast and selective annealing of steel rocket heads. Photographs, micrographs, diagram.

8193 Mechanized Austempering Line Shortens Heat-Treating Time. H. K. Jamesson. *Iron Age*, v. 175, Mar. 24, 1955, p. 100-101.

Austempering of wrenches in a new line using electric salt bath furnaces and mechanized conveyors has reduced processing time from 10 to 1¼ hr. Treatment is in three steps—austenitize, quench, and draw. Micrograph, photographs.

8194* Hardenability of Spring Steel. (Japanese.) Shigeo Owaku, Ryozo Isomura, Seinoshin Morikawa, and Hatsukichi Sato. *Journal of Railway Engineering Research (Japan)*, v. 12, no. 1, Jan. 10, 1955, p. 18-21.

Comparison of properties of several Japanese spring alloys. Diagrams, micrographs, graphs.

8195* Isothermal Heat Treatment of Nodular Cast Iron. **Izotermicheskaia zakalka chuguna s sharovidnym grafitom.** (Russian.) T. G. Demidova and M. N. Kuniavskii. *Liteinoe Proizvodstvo*, 1955, no. 2, Feb., p. 20-22.

Isothermal decomposition of austenite; micro-structure and microhardness; wear resistance. Graphs, micrographs, diagram. 6 ref.

8196 Vacuum Heat Treating. I. Opportunity Knocks in the Micron Range. II. Remove the Unwanted to Raise Performance Level. Richard L. Hoff and A. M. Bounds. *Steel*, v. 136, Apr. 11, 1955, p. 108-111; Apr. 18, 1955, p. 108-110.

Advantages of the process and the use of vacuum annealing in the removal of gases and unwanted compounds. Photographs, table, graph. 6 ref.

8197* Hardening of Aluminum-Magnesium Alloys. **Über die Aushärtung von Aluminium-Magnesium-Legierungen.** (German.) Otto Dahl and Klaus Detert. *Zeitschrift für Metallkunde*, v. 46, no. 2, Feb. 1955, p. 94-99.

Behavior during annealing; structure, hardness, tensile strength, and elongation; changes of thermoelectric power and electrical resistance for interpreting precipitation behavior. Micrographs, graphs, tables. 15 ref.

See also:

8233 (annealing Al-Mn alloys)
8346 (flame hardening of steel alloys)
8421 (heat treatment of Al alloys)
8422 (heat treatment of Cu alloys)

METALS—MECHANICAL AND PHYSICAL PROPERTIES

8198 Elastic Constants of Aluminum From 20°C to 400°C. Charles Zucker. *Acoustical Society of America, Journal*, v. 27, Mar. 1955, p. 318-320.

Use of ultrasonic pulse technique as a means of determining the elastic constants of polycrystalline Al. Diagram, graphs. 10 ref.

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Results of techniques developed and used to determine the mean effective emissivity of different surfaces from 100 to 800 F. Diagrams, graphs. 7 ref.

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Dependence of the yield rate on stress and temperature. Effect of nucleation and growth of Lüders' bands. Tables, graphs, diagrams, photograph. 5 ref.

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The magnaflux 'Met-L-Chek", and ultra-violet-light methods for detecting cracks in ferrous and non-ferrous metals.

8203 A Study of the Thermal Stability of Materials Used in Sintering Machine Pallets. J. B. Caine. *Blast Furnace and Steel Plant*, v. 43, Mar. 1955, p. 315-319.

Tests on three cast irons and two cast steels at temperatures of 1250, 1450, and 1650 F. Tables, graph, micrographs.

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Tests were made on 1-in. thick plates. The two methods generally gave a similar rating to the samples. Tables, graphs.

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8206 The Electrical Resistance of Dilute Copper Alloys at Very Low Temperatures. Guy K. White. *Canadian Journal of Physics*, v. 33, Mar.-Apr. 1955, p. 119-124.

Description of adiabatic demagnetization cryostat. Measurements near 1-K. Diagram, graph. 12 ref.

8207 Some Flexural Fatigue Tests on 75S-T Aluminium Alloy Sheet Specimens With Drilled Holes. J. M. Finney and J. Y. Mann. *Commonwealth of Australia, Dept. of Supply, Research and Development Branch*, A.R.L./S.M. 213, Nov. 1954, 8 p. + 8 plates. (TL529 Au78.2s)

Tests on unmatched specimens of clad and unclad 75S-T aluminum alloy and unclad 75S-T aluminum alloy with various stress concentrators. Tables, diagrams, photograph, graphs. 6 ref.

8208* Direct Determination of Brittleness Transition Temperature of Steels. **Sur la détermination directe de la température de transition de fragilité des aciers.** (French.) Georges Vidal and Anatole Popoff. *Comptes rendus*, v. 240, no. 5, Jan. 31, 1955, p. 487-489.

A new tensile test method permits more rational study of temper brittleness and fatigue. Diagram. 5 ref.

8209* Relation Between the Temperature of a Ferromagnetic Substance and the Heat Dissipated Internally by an Alternating Field. **Relation entre la température d'un corps ferromagnétique et la chaleur dissipée à son intérieur par un champ alternatif.** (French.) Gustave Ribaud and Denise Bordier. *Comptes rendus*, v. 240, no. 7, Feb. 14, 1955, p. 703-707.

A ferromagnetic substance placed in a H. F. alternating field is heated by Foucault currents and hysteresis, and heat dissipation studied as a function of temperature. Graphs. 2 ref.

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Proposes a new interpretation of brittleness, based on the existence of an order-disorder transformation. Graphs. 6 ref.

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Thermoelectric power data of layers of Al, vaporized in a vacuum, followed by exposure to air. Graph. 1 ref.

8212* Electromotive Force and Thermoelectric Power of the Aluminum-Silver Couple. **Force électromotrice et pouvoir thermoélectrique du couple aluminium-argent.** (French.) André Aron. *Comptes rendus*, v. 240, no. 8, Feb. 21, 1955, p. 852-854.

Prepared by vaporization, in vacuo, of pure Ag and pure Al, in relatively thick deposits, with an electric resistance near 1 Ω. Graph. 4 ref.

8213* Influence of the Holes (Vacancies) in the Crystal Lattice on the Electrical Resistance of a Metal. **O vliianii dyrok (vakansii) v kristallicheskoi reshetke na elektricheskoe soprotivlenie metalla.** (Russian.) B. G. Lazarev and O. N. Ovcharenko. *Doklady Akademii Nauk SSSR*, v. 100, no. 5, Feb. 11, 1955, p. 875-878.

Mathematical treatment. Increase of residual resistance with increase of heating temperature before quenching. Graphs. 11 ref.

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Design formulas for temperatures from about 950 to 1,070 F. Graphs, tables.

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Effects on mechanical properties including ductility, tensile, and impact properties. Graphs, photographs, tables.

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8223* Results of Observations of Metal and Alloy Micro-Structures During Deformation Under Tensile Stress at High Temperature. **Nekotorye rezul'taty nabliudeniia za mikrostroeniem metallov i splavov v protsesse deformirovaniia pri vysokotemperaturnom nagreve i rastiazhenii.** (Russian.) M. G. Lozinskii. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1954, no. 10, Oct., p. 3-13 + 2 plates.

Description of method and equipment for testing at temperatures of 400 to 1000 C. Diagrams, photographs, micrographs. 9 ref.

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Interference pattern method of determining yield point and residual deformation. Diagrams, graphs, table. 7 ref.

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Studies of plastic deformation in the region just beyond the elastic limit. Diagram, tables, graphs. 7 ref.

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Effect of heat-treatment methods and metals hardness on service life. Graphs, diagrams.

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Results of tests on notched and unnotched tensile specimens at − 196 to + 100 C. Table, micrographs, graphs. 10 ref.

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8233* Effect of High-Temperature Annealing of Ingots on Structure Formation and Properties of AlMn Alloys (Aluman). **Einfluss der Barren-Hochglühung auf Gefügeausbildung und Eigenschaften von AlMn-Legierungen (Aluman).** (German.) H. Hug. *Metall*, v. 9, nos. 5-6, Mar. 1955, p. 176-180.

Effect of heat treating temperature and time on the rolling properties of continuously cast ingots and on the mechanical properties of the rolled sheets. Graphs, table, micrographs.

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Measurements of longitudinal magnetostriction of specimens over the temperature range − 180 to 360 C. Diagrams, tables, graphs. 18 ref.

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Torsion testing, chemical activity, strain hardening, and rolling are considered in study of deformation by torsion. Diagrams, graphs.

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New life scale for the representation of S-N curves for estimating the scatter of fatigue strength as a function of fatigue life. Tables, graphs. 7 ref.

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8256* Steep Decline of the Curve of Notched Bar Toughness and Apperance of Fracture of the Notched Bars With Heavy Plates Made of Soft Steels. **Steilabfall der Kerbschlagzähigkeit und das Bruchaussehen der Kerbschlagproben bei Grobblechen aus weichen Stählen.** (German.) Heinz Kornfeld. *Stahl und Eisen*, v. 75, no. 5, Mar. 10, 1955, p. 265-278.

Relations between the impact energy absorbed and occurrence of brittle fractures. Graphs, tables, photographs. 7 ref.

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Creep tests of Al of 99.99% purity. Diagrams, graph, photographs, micrographs. 8 ref.

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Experimental equipment, procedures, and results. Tables, refractograms, micrographs, diagram, graphs. 16 ref.

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Evaluation of notch effect of ferrous and non-ferrous metals under various loading conditions. Diagrams, tables, graphs. 14 ref.

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Interpretation of a diagram of "ultimate cycles" as a means to determine the fatigue characteristics of materials. Tables, graphs, diagrams. 8 ref.

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Temperature dependence of damping and modulus of elasticity; effects of deformation and grain size; relaxation by means of grain boundary viscosity. Graphs. 20 ref.

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Dependence of internal friction upon temperature and composition; activation energy for viscous flow. Tables, graphs. 15 ref.

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8277* Strengths of Bond and Distortions in Crystals of Martensite. **O silakh sviazi i iskazheniiakh v kristallakh martensita.** (Russian.) V. K. Kritskaia, G. V. Kurdiumov, and N. M. Nodia. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 2, Feb. 1955, p. 117-181.

Limits of elastic deformation in martensite and α-iron; effects of C content and temperature. Table, graph. 9 ref.

8278* Problem of the Physical Nature of Cavitational Fracture. **K voprosu o fizicheskoi prirode kavitatsionnogo razrusheniia.** (Russian.) L. A. Glikman, V. P. Tekht, and Iu. E. Zobachev. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 2, Feb. 1955, p. 280-298 + 1 plate.

Metallographic, X-ray, and microhardness study of C and austenitic steels, high-strength cast iron, and brass. Photograph, micrographs, graphs, tables. 9 ref.

8279* Hardness and Stress in a Plastically Deformed Body. **Tverdost' i napriazhenie v plasticheski deformirovannom tele.** (Russian.) A. M. Rozenberg and L. A. Khvorostukhin. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 2, Feb. 1955, p. 313-322.

Shows that the numerical value of indentation hardness is a function of total deformation of the material; relation to machinability. Graphs, table, diagram. 10 ref.

Books and Miscellaneous Publications

8280 Fatigue of Metals and Structures. H. J. Grover, S. A. Gordon, and L. R. Jackson. 394 p. 1954. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. (TA460 G91f)

Nature of fatigue failures; dependability of fatigue-test data; factors influencing fatigue behavior, and methods of detecting fatigue.

8281 Design Manual for High-Strength Steels. H. Malcolm Priest and John A. Gilligan. 174 p. 1954. United States Steel Corp., Pittsburgh. (TA685 P93d)

Engineering data on mechanical properties and corrosion resistance. Allowable unit stresses. Designing against corrosion.

See also:

8046 (combines stresses in Al alloys)
8159 (mechanical properties of cast iron)
8192 (ductility restored by annealing)
8197 (tensile strength and hardness of Al-Mg alloys)
8322 (effects of surface deformations on tensile and torsional properties)
8404 (plasticity of metal crystals)
8549 (strength of steel welds)

METALS—MECHANICAL WORKING

8282 Cope Talks on Draw Dies. XXV. How to Make Shells With Ribs, Bosses and Projections. Stanley R. Cope. *American Machinist*, v. 99, Mar. 14, 1955, p. 145-148.

Ways to cause the metal to flow properly in a series of operations. Diagrams. (To be continued.)

8283 High Speed Heating of Steel for Plastic Deformation. E. G. de Coriolis. *Blast Furnace and Steel Plant*, v. 43, Mar. 1955, p. 320-324, 351.

Factors influencing the max. rate of heating billets in gas-fired furnaces. Graphs, tables. 7 ref.

8284 Machining and Machinability. Francis W. Boulger. *Canadian Metals*, v. 18, Mar. 1955, p. 40-41.

Machinability depends on the inherent properties of the material and also on the machining operation. The most important properties affecting machinability are the frictional behavior and the strength of the metal in the actual cutting direction. Graphs, diagram, photograph. (To be continued.)

8285* **Electronic Tracer Control of Machine Tools.** J. A. Stokes. *Engineer*, v. 199, Feb. 25, 1955, p. 268-270.

Description of several forms of tracer control equipment which are applicable to a wide range of machine tools. Photographs, diagrams.

8286 Stretch-Flattening of Large Sheets and Plates. Hydraulic Machine With 800-Ton Pull. *Engineering*, v. 179, Mar. 4, 1955, p. 282-284.

Equipment and operation procedures. Diagrams, photographs.

8287 Drawing and Forming Chromium-Nickel Stainless Steels. W. E. McFee. *Finish*, v. 12, Apr. 1955, p. 27-30.

Die practice and lubricants. Photographs, table.

8288* Materials Standards for Forging. **Kuźnicze normy materiałowe.** (Polish.) Wiesław Wróblewski. *Hutnik*, v. 21, no. 12, Dec. 1954, p. 395-399.

Principles and equations for efficient utilization of rods and billets used in forging and stamping. Table. 5 ref.

8289* Grinding and Buffing of Semiworked Metal Before Fabrication and Finishing of the Piece. **Molatura e lucidatura del metallo semilavorato prima della fabbricazione e finitura del pezzo.** (Italian.) *Industria Meccanica*, v. 7, no. 1, Jan. 1955, p. 29-32.

Metals—Mechanical Working

List of suggested techniques as aids for above operations. Table.

8290 A Hot Impact Tensile Test and Its Relation to Hot-Working Properties. E. A. Leech, P. Gregory, and R. Eborall. *Institute of Metals, Journal*, v. 83, Mar. 1955, p. 347-353.

Simple, rapid laboratory test which can be used to assess the hot workability of materials. Diagrams, tables, graphs. 4 ref.

8291 Hot Rolling. A Study of Draught, Spread and Elongation. Z. Wusatowski. *Iron & Steel*, v. 28, Mar. 1955, p. 89-94.

Coefficient of spread and roll pass design calculations. Graphs, tables.

8292 Metal Machining. II. Cutting Forces and Cutting Conditions. III. Angles of Cutting Tools. W. Alfred Carter. *Machinery Lloyd (Overseas Ed.)*, v. 27, Feb. 26, 1955, p. 69, 71-74; Mar. 19, 1955, p. 37, 39, 41-43; Mar. 26, 1955, p. 69, 71-73.

Effect of chip heat and cutting fluid on tool life. Diagrams, photographs.

8293* **A Study of Electro-Erosion Processes. Sparks and Arcs.** H. Axer. *Machinist (London)*, v. 99, Mar. 25, 1955, p. 529-534.

Differences of principle and result of electro-erosion methods. Circuit diagrams, oscillograms, photographs, tables.

8294 Short Run Press-Formed Parts. Malcolm W. Riley. *Materials & Methods*, v. 41, Mar. 1955, p. 121-136.

Forming methods; advantages and limitations; design considerations. Photographs, diagrams, tables.

8295 Considerations for Selecting Steel Extrusions. S. O. Evans. *Metal Progress*, v. 67, Apr. 1955, p. 91-95.

Description of Ugine-Séjournet extrusion process involving use of molten glass a lubricant. Diagrams.

8296* Comparative Examination of Different Systems of Hot Deformation. **Examen comparatif des différents systèmes de déformation à chaud.** (French.) Giovanni Dallapicola. *Métallurgie et la construction mécanique*, v. 87, no. 2, Feb. 1955, p. 129, 131, 133.

Discusses hand, hammer, press, and automatic forging. Drawings, micrographs, table.

8297* Causes of Lamination of Brass Used in Deep Drawing. **Przyczyny rozwarstwienia się mosiądzu do głębokiego tłoczenia.** (Polish.) S. Balicki and L. Gablankowski. *Prace Instytutów Ministerstwa Hutnictwa*, 1954, no. 6, p. 315-320.

The residual β-phase and the H entering at time of melting and pouring are responsible for the defects, and both are eliminated by heating at 800 C before plastic working. Micrographs, tables, graph, diagram, photographs. 8 ref.

8298 The Rolling of Metals and Alloys. IV. Resistance to Deformation and Other Factors Which Determine the Magnitude of the Rolling Load. E. C. Larke. *Sheet Metal Industries*, v. 32, no. 335, Mar. 1955, p. 217-222, 224.

Effects of roll surface condition and initial strip thickness. Diagrams, micrographs, graphs. 12 ref. (To be continued.)

8299 The State of Lubrication in Wire Drawing Operations. R. Tourret. *Wire and Wire Products*, v. 30, Mar. 1955, p. 299-303, 347.

Tests of wire-drawing lubricants to determine the effects of pressures and temperatures on dies and on the Al, brass, Cu, and steel wire being drawn. Graphs, diagram, photograph, tables. 26 ref.

8300 Graphic Analysis of the Relation Between the Wire and Capstan Speeds on Multiple Wire-Drawing Machines. J. A. Giaro. *Wire and Wire Products*, v. 30, Mar. 1955, p. 305-312.

Graphic method for determining the relative speeds of drawing capstans in terms of die diameters. Chart, diagrams. 11 ref.

See also:

8110 (direct rolling of steel)
8279 (relation of hardness to machinability)

METALS—METALLOGRAPHY, TRANSFORMATIONS, AND STRUCTURES

8301 Growth of Potassium Halide Crystals From Aqueous Solution. (English.) J. B. Newkirk and G. W. Sears. *Acta Metallurgica*, v. 3, no. 1, Jan. 1955, p. 110-111.

Explanation of formation of rods, platelets, or parallelepipeds by a new growth mechanism. 4 ref.

8302 Solid Solution Equilibria in the Zirconium-Hydrogen System. Russell K. Edwards, P. Levesque, and D. Cubicciotti. *American Chemical Society, Journal*, v. 77, Mar. 5, 1955, p. 1307-1311.

Phases of the system, Zr-H determined from 1 to 760 mm. of Hg and from 600 to 900 C. Tables, graphs, phase diagram. 14 ref.

8303* Present State of Research on the Aging of Mild Steels. **Der gegenwärtige Stand der Forschung über die Alterung weicher Stähle.** (German.) Wolfgang Wepner. *Archiv für das Eisenhüttenwesen*, v. 26, no. 2, Feb. 1955, p. 71-98.

Effect of quenching, aging, and recrystallization due to cold working upon mechanical and physical properties, solubility, and diffusion; theory of aging and precipitation. Graphs. 13 ref.

8304* Orientation Connections Between Austenite, the Intermediate Stage, and Martensite. **Orientierungszusammenhänge zwischen Austenit, Zwischenstufengefüge und Martensit.** (German.) Wilhelm Hofmann and Günter Schuhmacher. *Archiv für das Eisenhüttenwesen*, v. 26, no. 2, Feb. 1955, p. 99-104.

Radiographic investigation of a Cr-V steel. Radiographs, diagrams. 9 ref.

8305* Crystallization of Ledeburite Eutectic. **Über die Kristallisation des Ledeburit-Eutektikums.** (German.) Erich Scheil and Dieter Pohl. *Archiv für das Eisenhüttenwesen*, v. 26, no. 2, Feb. 1955, p. 105-108.

Significance of Si content for undercooling; hardness and structures of refined cast iron. Graphs, micrographs. 11 ref.

8306* Oriented Precipitates of Secondary Graphite in Gray Cast Iron. **Gerichtete Ausscheidungen von Sekundärgraphit in Grauguss.** (German.) Wilhelm Hofmann and J. M. Sistiaga. *Archiv für das Eisenhüttenwesen*, v. 26, no. 2, Feb. 1955, p. 109-112.

Occurrence and origin; relation of orientation with austenite; growth of monocrystals from gray iron. Graphs, micrographs, photograph. 6 ref.

8307* Investigations of the Structure of Steel With the Small Electron Microscope. **Gefügeuntersuchungen an Stahl mit einem Klein-Elektronenmikroskop.** (German.) Ernst Kinder. *Archiv für das Eisenhüttenwesen*, v. 26, no. 2, Feb. 1955, p. 113-116.

Comparison with results from optical and large electron microscope. Micrographs. 9 ref.

8308 Dislocations in Germanium Crystals. F. Lincoln Vogel, Jr. *Bell Laboratories Record*, v. 33, Mar. 1955, p. 104-107.

Dislocation theory; effects of dislocations on semiconducting properties. Photographs, diagram, micrograph.

8309 Supercooling of Transformation Process as a Basis for the Martensite Transformation. I-II. E. Houdremont and O. Krisement. *Henry Brutcher Translation Nos.* 3339-3340, 69 p. (Slightly condensed from *Archiv für das Eisenhüttenwesen*, v. 24, nos. 1-2, 1954, p. 53-67.) Henry Brutcher, Altadena, Calif.

Study of forces and mechanisms involved in martensite reactions. Graphs. 37 ref.

8310 On the Irreversibility of Iron-Nickel Alloys. E. Scheil. *Henry Brutcher Translation No.* 3349, 20 p. (Slightly condensed from *Archiv für das Eisenhüttenwesen*, v. 24, nos. 3-4, p. 153-160.) Henry Brutcher, Altadena, Calif.

Metals—Metallography, Transformations, and Structures

Previously abstracted from original. See item 11018, v. 2, Oct. 1953.

8311 Metallographic Studies of Hard Chromium Deposits. L. Koch and G. Hein. *Henry Brutcher Translation No.* 3422, 7 p. (From *Metalloberfläche*, v. 7, no. 10, 1953, p. 145-148.) Henry Brutcher, Altadena, Calif.

Critical review of literature; experimental data on factors influencing structure and properties. Micrographs. 10 ref.

8312 Gases in Metals. P. Bardenheuer. *Henry Brutcher Translation No.* 3440, 15 p. (From *Metall*, v. 6, nos. 13-14, 1952, p. 351-356.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 10170, v. 1, Aug. 1952.

8313 Process of Formation of Sigma Phase in 18% Cr, 10% Ni, 2% Mo Steel. F. Braumann and H. Krächter. *Henry Brutcher Translation No.* 3447, 20 p. (From *Archiv für das Eisenhüttenwesen*, v. 25, nos. 9-10, 1954, p. 479-488.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 4355, v. 4, Mar. 1955.

8314 Formation of Graphite on the Surface of Steel During Heat Treating in Vacuum. E. Z. Graifer and I. V. Salli. *Henry Brutcher Translation No.* 3469, 5 p. (From *Doklady Akademii Nauk SSSR*, v. 97, no. 4, 1954, p. 663-665.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 1167, v. 4, Jan. 1955.

8315* Supersaturation of Vacancies During Diffusion in Brasses. **Sursaturation des lacunes pendant la diffusion dans les laitons.** (French.) André Accary. *Comptes rendus*, v. 240, no. 5, Jan. 31, 1955, p. 519-522.

Determination based on the kinetics of formation of microscopic porosities appearing in the zone of diffusion. Micrograph, graphs. 5 ref.

8316* Relationship Between X-Ray Diffraction Diagrams and Micrographic Appearance of a Polygonized Aluminum Crystal. **Relation entre les diagrammes de diffraction des rayons X et l'aspect micrographique d'un cristal d'aluminium polygonisé.** (French.) Christian de Beaulieu. *Comptes rendus*, v. 240, no. 5, Jan. 31, 1955, p. 522-524.

Pure crystals polygonized by prolonged annealing show that the relative disorientation of blocks may present different appearances according to the crystallographic planes studied. Micrographs.

8317* Determination by Electron Diffraction of the Structure of Oxide Films Formed on the Surface of Iron. **Détermination par diffraction électronique de la constitution des films d'oxydes formés à la surface du fer.** (French.) Jean Moreau and Jean Bardolle. *Comptes rendus*, v. 240, no. 5, Jan. 31, 1955, p. 524-526.

Oxide films formed at 250 to 700 C similar to those formed under more favorable conditions. 8 ref.

8318* Kinetics of the Martensitic Transformation in a Ferronickel. **Cinétique de la transformation martensitique dans un ferronickel.** (French.) Jean Philibert. *Comptes rendus*, v. 240, no. 5, Jan. 31, 1955, p. 529-531.

Effects resulting upon varying the C and N contents. Graphs. 3 ref.

8319* Eutectoid Transformation of a Copper Alloy With 6% Beryllium. **Sur la transformation eutectoïde d'un alliage de cuivre à 6% de beryllium.** (French.) Arunachala Viswanathan. *Comptes rendus*, v. 240, no. 6, Feb. 7, 1955, p. 626-628.

Verifies different methods of transformation by quenching and tempering of Cu and Be alloys in the β-phase. 2 ref.

8320* Dilatometric Study of the $\alpha \rightleftharpoons \sigma$ Transformation in Iron-Chromium Alloys. **Étude dilatométrique de la transformation $\alpha \rightleftharpoons \sigma$ dans les alliages fer-chrome.** (French.) Paul Bastien and Gilles Pomey. *Comptes rendus*, v. 240, no. 8, Feb. 21, 1955, p. 866-868.

An expansion-temperature diagram of the various metastable states is established, making it possible to interpret expansion curves encountered in practice. Graphs.

8321* Diffusion of Antimony and Tin in a Semiconductor Alloy SbZn. **O diffuzii sur'my i olova v poluprovodnikovom soedinenii SbZn.** (Russian.) B. I. Boltaks. *Doklady Akademii Nauk SSSR*, v. 100, no. 5, Feb. 11, 1955, p. 901-903.

Temperature relation to diffusion coefficient. Graph. 8 ref.

8322* Spontaneous and Accelerated Aging of Steel Wires. **Samorzutne i przyspieszone starzenie drutów stalowych.** (Polish.) Zygmunt Steininger. *Hutnik*, v. 21, no. 11, Nov. 1954, p. 346-352.

Effects of aging and subsequent surface deformation on tensile and torsional properties. Tables, graphs. 15 ref.

8323 Pseudo-Binary Phase Sections Between Laves Phases in Ternary Alloys of Uranium. G. B. Brook, G. I. Williams, and E. M. Smith. *Institute of Metals, Journal*, v. 83, Feb. 1955, p. 271-276 + 2 plates.

Phase boundaries at 700 and 900 C were determined in the pseudo-binary systems UMn_2-UNi_2, UFe_2-UNi_2, and UCo_2-UNi_2. Tables, graphs, photographs, micrographs. 16 ref.

8324 The Constitution of Uranium-Zirconium Alloys. D. Summers-Smith. *Institute of Metals, Journal*, v. 83, Feb. 1955, p. 277-282 + 1 plate.

Study of phases by metallographic, dilatometric, and X-ray methods, using alloys prepared by arc melting. Graph, tables, micrographs. 12 ref.

8325 Lattice Spacings of the Aluminium-Rich Solid Solution Containing Magnesium and Silicon. R. B. Hill and H. J. Axon. *Institute of Metals, Journal*, v. 83, Mar. 1955, p. 354-356.

Measurements show a negative deviation from simple additivity, the magnitude of which increases with increasing alloy content of the solid solution. Graph, table. 5 ref.

8326 Some Observations on Isothermal Transformations of Eutectoid Aluminium Bronzes Below Their M_s Temperatures. R. Haynes. *Institute of Metals, Journal*, v. 83, Mar. 1955, p. 357-358 + 3 plates.

Micro-structural changes occurring during transformations. It is suggested that isothermal formation of martensite occurs and that both martensite and the phase from which it forms may transform to eutectoid. Table, micrographs. 5 ref.

8327 The Metastability of Austenite in an 18/8 Cr-Ni Alloy. B. Cina. *Iron and Steel Institute, Journal*, v. 179, Mar. 1955, p. 230-239 + 6 plates.

Investigations by metallographic, thermomagnetic, and room- and high-temperature X-ray diffraction methods. Micrographs, photograph, tables, graphs. 16 ref.

8328* Metallographic Analysis and Its Application to Steel. **Metallografisk analys och dess tillämpning vid under sökning av stål.** (Swedish.) Sakari Heiskanen. *Jernkontorets Annaler*, v. 139, no. 2, 1955, p. 78-134.

Methods for isolating and studying carbides and non-metallic inclusions. Graphs, diagrams, micrographs, tables. 29 ref.

8329 Solubility of Oxygen in Liquid Nickel and Fe-Ni Alloys. Henry A. Wriedt and John Chipman. *Journal of Metals*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 203, Mar. 1955, p. 477-479.

Oxygen analyses were made on samples from melts made in a 30 lb. induction furnace. Tables, graphs. 13 ref.

8330* **The Mechanism of the Irradiation Disordering of Alloys.** G. H. Kinchin and R. S. Pease. *Journal of Nuclear Energy*, v. 1, Feb. 1955, p. 200-202.

Calculations suggesting possible mechanism responsible for the rapid disordering produced in ordered alloys. 6 ref.

8331* The Aluminum-Silicon System. **Über das System Aluminium-Silizium.** (German.) H. Spengler. *Metall*, v. 9, nos. 5-6, Mar. 1955, p. 181-186.

Solubility of Al in Si in the solid state; micro-structure of eutectic Al-Si alloy. Micrographs, graphs, table. 41 ref.

Metals—Metallography, Transformations, and Structures

8332* Reactions in the Solid State Between Metal and Inclusions. **Sulle reazioni allo stato solido tra metallo ed inclusioni.** (Italian.) R. Zoja. *Metallurgia italiana*, v. 47, no. 1, Jan. 1955, p. 15-18.

Behavior of non-metallic inclusions in refined ferrochrome, other ferro alloys, and steels. Table, graph, micrographs. 7 ref.

8333* New Etching Reagents for Certain Types of Ferritic, Semiferritic, Martensitic, and Austenitic Stainless Steels. **Nuovi reattivi di attacco per alcuni tipi di acciai inossidabili ferritici, semi-ferritici, martensitici ed austenitici.** (Italian.) G. Catella and C. Giometto. *Metallurgia italiana*, v. 47, no. 1, Jan. 1955, p. 19-20.

Specific reagents for revealing specific structures. Table, micrographs.

8334 A Universal Polishing Method. H. S. Cannon. *Metal Progress*, v. 67, Apr. 1955, p. 83-86.

Standard procedures for using two grades of high-purity alumina polishing powder. Micrographs.

8335 Radioactive-Tracer Diffusion Studies. (Digest of "The Diffusion of Iron in Nickel", by M. B. Neiman, A. Ya. Shinyaev, and B. G. Dzantiev; *Doklady Akademii Nauk SSSR*, v. 91, 1953, p. 265-267.) *Metal Progress*, v. 67, Apr. 1955, p. 196.

Studies of electroplated coatings of Fe on Ni foils. Activation energies and diffusion coefficients were determined. Table.

8336 The Kirkendall Effect in Metals. Possible Applications to Solve Porosity and Plating Problems. K. Sachs. *Metal Treatment and Drop Forging*, v. 22, Mar. 1955, p. 119-125.

Experimental evidence and theories of diffusion of solid metals. How the formation of diffusion micropores, and the heating of such discontinuities in the lattice, associated with the phenomena, can be applied in considering porosity in powder metallurgy and the plating of alloys. Graphs, table, diagrams. 25 ref.

8337* Present State of Metallography of Alloyed Austenites, Particularly in Steels Type 18/8. **État actuel de la métallographie des austénites alliées, notamment dans les aciers du type 18/8. IV.** Austenite Stabilization and Sensitization of Martensite. **Stabilisation austénitique et sensibilisation martensitique.** (French.) Paul Bastien and Jacques Dedieu. *Métaux, Corrosion-Industries*, v. 30, no. 353, Jan. 1955, p. 1-8.

Phenomena in the transformation of austenite to martensite. Micrograph, graphs, table.

8338* Basic Processes of Magnetization in Permanent Alnico Magnet Alloys. **Über die Grundprozesse der Magnetisierung bei Alnico-Dauermagnetlegierungen.** (German.) Hermann Fahlenbrach. *Naturwissenschaften*, v. 42, no. 3, Feb. 1955, p. 64-65.

Electron microscopic investigation of structures in an optimum magnetic state. Micrographs. 2 ref.

8339* Measurement of Lattice Constants With Electron Beams on Thin Films of Silver. **Gitterkonstantenmessungen mit Elektronenstrahlen an dünnen Silberschichten.** (German.) V. Hauk and A. Krings. *Naturwissenschaften*, v. 42, no. 3, Feb. 1955, p. 68-69.

Experimental data and comparison with results obtained by other authors; factors affecting lattice-constant measurements. Graph. 7 ref.

8340* Investigation of Segregation in Cast Irons by Radiographic Techniques. Jerome Cohen, Eugene Hall, Laurence Leonard, and Robert Ogilvie. *Nondestructive Testing*, v. 13, Mar.- Apr. 1955, p. 33-34.

Utilization of microradiography in the metallographic study of metal structures. Photographs, micrographs.

8341* On the Precipitation Process in Aluminium-Zinc-Magnesium Alloys. I. Al-$Al_2Zn_3Mg_3$ System. (English.) Ken-ichi Hirano and Yutaka Takagi. *Physical Society of Japan, Journal*, v. 10, no. 3, Mar. 1955, p. 187-192.

Existence of two separate processes was confirmed. Graphs. 12 ref.

8342* Structural Hardening of Aluminum-4% Copper Alloys. **Le durcissement structural des alliages aluminium-cuivre 4%.** (French.) Adrien Saulnier. *Revue de l'aluminium*, v. 32, no. 217, Jan. 1955, p. 41-46.

Theory of precipitation hardening. Metallographic and X-ray confirmation of the mechanism. Graphs, micrographs. 15 ref.

8343 Oxidation Method for Measuring True Austenitic Grain Size. (Digest of "Perfecting the Oxidation Method to Permit Showing the True Austenitic Grain of Steels", by A. Kohn; *Revue de Metallurgie*, v. 57, Feb. 1954, p. 129-137.) *Metal Progress*, v. 67, Apr. 1955, p. 158, 160, 162.

Test procedure and evaluation of results.

8344* The Principles of the Iron-Carbon Diagram. **Die Grundlagen des Eisen-Kohlenstoff-Diagramms.** (German.) P. Steidl. *Schweissen und Schneiden*, v. 7, no. 2, Feb. 1955, p. 61-66.

The structure of metals; the Fe-C space-lattice; determination of constitution diagrams and their significance; effect of alloying elements. Diagrams, graphs, micrographs. 4 ref.

8345* Precipitation From Solid Solution of Lead in Magnesium. (English.) Ken-ichi Hirano, Hideyo Maniwa, and Yutaka Takagi. *Physical Society of Japan, Journal*, v. 10, no. 3, Mar. 1955, p. 193-197.

Results reveal that the aging process is constituted from two discrete reactions. Graphs. 17 ref.

8346* The Process of Flame-Hardening, Represented in the Time-Temperature Transformation Diagram for Continuous Cooling. **Der Vorgang des Flammenhärtens, dargestellt im Zeit-Temperatur-Umwandlungs-Schaubild für kontinuierliche Abkühlung.** (German.) Adolf Rose and Leo Rademacher. *Stahl und Eisen*, v. 75, no. 4, Feb. 24, 1955, p. 199-210.

Effect of type and performance of the torch and rate of feed on the temperature distribution, process of cooling and hardness penetration. Diagrams, graphs, micrographs. 8 ref.

8347* Recent Developments on Apparatus to Prepare Polished Micro-Sections and for Metallographic Examination. **Neuere Entwicklungen an Geräten zur Schliffherstellung und metallographischen Untersuchung.** (German.) Richard Pusch. *Stahl und Eisen*, v. 75, no. 6, Mar. 24, 1955, p. 335-345.

Specimen preparation, methods of illumination, optical equipment, and technique of obtaining photo-micrographs. Photographs, micrographs, table, diagrams. 52 ref.

8348* Influence of Carbide-Forming Elements on the Annealing Brittleness of Steel. **Vliianie karbidoobrazuiushchikh elementov no otpusknuiu khrupkost' stali.** (Russian.) V. I. Prosvirin and E. I. Kvashnina. *Vestnik Mashinostroeniia*, v. 35, no. 2, Feb. 1955, p. 58-67.

Experimental data on the effects of Cr, Mn, Mo, W, Nb, V, and Ti carbides. Graphs, diagrams, tables, micrographs. 10 ref.

8349* The Equilibrium Between Oxygen and Sulfur in Molten Copper at 1150 C. **Das Gleichgewicht zwischen Sauerstoff und Schwefel in flüssigem Kupfer bei 1150°C.** (German.) Friedrich Johannsen and Ulrich Kuxmann. *Zeitschrift für Erzbergbau und Metallhüttenwesen*, v. 8, no. 2, Feb. 1955, p. 45-59.

Method and apparatus for measuring solubility of SO_2; equilibrium reactions over a wide concentration range and at different gas pressures; combining conditions for O and S atoms in the melt. Graphs, diagram, photographs, tables. 20 ref.

3850* A New Point of View on the Problem of the Bonding State of Interstitial Structures. **Ein neuer Gesichtspunkt zur Frage des Bindungszustandes von Einlagerungsstrukturen.** (German.) Konrad Schubert. *Zeitschrift für Metallkunde*, v. 46, no. 2, Feb. 1955, p. 100-109.

Simple structures with A-1 correlation; structures with one local correlation, which deviated little from a A-1 correlation; simple structures with B-1 correlation; percarbides and related compounds; complex structures with B-1 and A-1 structures. Diagrams. 33 ref.

8351* Nucleus Formation and Rate of Growth During the Recrystallization of Pure Al. **Keimbildungs- und Wachstumsgeschwindigkeit bei der Rekristallisation von Reinaluminium.** (German.) Frank Haessner and Kurt Lücke. *Zeitschrift für Metallkunde*, v. 46, no. 2, Feb. 1955, p. 110-118.

Studies on thin Al wire shows effects of temperature, time, degree of deformation, and amount of impurities. Graph, tables, photograph. 28 ref.

8352* Gold-Palladium-Copper Alloys. **Über Gold-Palladium-Kupfer-Legierungen.** (German.) Ernst Raub and Georg Wörwag. *Zeitschrift für Metallkunde*, v. 46, no. 2, Feb. 1955, p. 119-128.

X-ray, metallographic, and electrical resistance data to determine phase diagrams. Tables, micrographs, graphs. 13 ref.

8353* Structure of Superconductors. **Struktura sverkhprovodnikov. VIII.** X-Ray and Metallographic Investigation of the Bismuth-Rhodium System. **Rentgenograficheskoe i metallograficheskoe issledovanie sistemy vismut-rodii.** (Russian.) N. N. Zhuravlev and G. S. Zhdanov. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki*, v. 28, no. 2, Feb. 1955, p. 228-235 + 2 plates; disc., p. 235-236.

Phase characteristics, solubilities, densities, and microhardness are determined for three compounds, with polymorphic modifications according to temperature. Micrographs, tables, phase diagram, graph. 15 ref.

8354* Variations in the Intensity of X-Ray Interferences During the Aging of Nickel-Chromium-Titanium-Aluminum Alloy. **Izmeneniia intensivnosti rentgenovskikh interferentsii pri starenii nikel'-khrom-titan-aliuminievogo splava.** (Russian.) G. V. Kurdiumov and N. T. Travina. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 2, Feb. 1955, p. 182-187.

Effects of quenching at 1000, followed by aging at 500 to 800 C. Tables, graphs. 7 ref.

8355* Influence of the Cooling Rate on the Kinetics of the Transformation of Austenite Into Martensite. **Vliianie skorosti okhlazheniia na kinetiku prevrashcheniia austenita v martensit.** (Russian.) A. P. Guliaev and A. P. Akshentseva. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 2, Feb. 1955, p. 299-312.

Data for Cr-V steel cooled to room and sub-zero temperatures. Tables, graphs, micrographs. 7 ref.

See also:

8197 (structure of Al-Mg alloys)
8823 (micro-structure deformation)
8254 (micro-structural changes of steels)

METALS—POWDER

8356 Hot Pressing Technique for Metal Carbides and a Semiautomatic Hot Press. J. Rietveld. *Henry Brutcher Translation No.* 3356, 7 p. (From *Metall*, v. 6, nos. 3-4, 1952, p. 81-82.) Henry Brutcher, Altadena, Calif.

Influence of amount and nature of binder, temperature, and die design on pressing characteristics. 5 ref.

8357 Porosity and Permeability Changes During the Sintering of Copper Powder. G. Arthur. *Institute of Metals, Journal*, v. 83, Mar. 1955, p. 329-336.

Measurements on Cu powders sintered in H for periods up to 100 hr. at 1000 C. Diagrams, graphs, tables. 14 ref.

8358 Resistance Sintering of Powder Compacts. *Metal Industry*, v. 86, Mar. 4, 1955, p. 176.

Equipment and operating procedures. 1 ref.

8359 Production of Copper Strip. H. Franszen. *Metal Industry*, v. 86, Mar. 25, 1955, p. 227-229. (From *Zeitschrift für Metallkunde*, v. 45, no. 6, June 1954, p. 328-331.)

Previously abstracted from original. See item 16393, v. 3, Nov. 1954.

8360 Now: High Strength Alloy Steel Powder Metal Parts. *Product Engineering*, v. 26, Mar. 1955, p. 133-138.

Production of products from pre-alloyed steel powders. Properties and design factors. Photographs, micrographs, tables, graphs.

8361 Improved Tungsten Carbide-Cobalt Compacts by Electric-Resistance Sintering. Perry G. Cotter, J. A. Kohn, and R. A. Potter. *U. S. Bureau of Mines, Report of Investigations* 5100, Jan. 1955, 19 p. (TN21 Un3r)

Effects of high temperatures and pressures on mechanical properties. Photographs, diagram, tables, graphs.

See also:

8336 (porosity in powder metallurgy)

MINING ENGINEERING

8362 Sea-Water Mud Makes Good Drilling Fluid. T. B. O'Brien. *Oil and Gas Journal*, v. 53, Mar. 28, 1955, p. 118-120.

Salt tends to prevent hydration of clays and shales. Mud making is reduced, thereby reducing the amount of chemical needed as well as shale trouble down hole. Tables.

8363 Eighteenth Technical Conference on Petroleum Production. *Pennsylvania State University, Mineral Industries Experiment Station Bulletin No.* 64, 139 p. (TN21 P38b)

Twelve papers on petroleum recovery procedures. Graphs, photographs, tables, diagrams.

8364 Drilling Practices in the Permian Basin. R. J. Bromell. *Petroleum Engineer (Management Ed.)*, v. 27, Apr. 1955, p. 55B + 5 pages.

Practices and techniques are studied and evaluated. Tables, photographs, graph, diagram.

NONDESTRUCTIVE TESTING

8365 Ultrasonic Methods for Studying the Properties of Hardened Steel and for Detecting Internal Defects in Steel Parts. S. Ya. Sokolov. *Henry Brutcher Translation No.* 3392, 19 p. (From *Zhurnal Tekhnicheskoi Fiziki*, v. 11, nos. 1-2, 1941, p. 160-169.) Henry Brutcher, Altadena, Calif.

Fundamentals of ultrasonic testing; measurement of case depth and detection of inclusions. Diagrams, micrographs, photographs.

8366 Magnetic and Electromagnetic Sorting of Semi-finished Steel and of Mass-Produced Parts. F. Förster. *Henry Brutcher Translation No.* 3467, 20 p. (Condensed from *Archiv f.d. Eisenhüttenwesen*, v. 25, nos. 7-8, 1954, p. 383-392.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 17981, v. 3, Dec. 1954.

8367 How to Sort Plain Carbon Steels by Spark Testing. W. Jäniche and K. -H. Saul. *Henry Brutcher Translation No.* 3472, 5 p. (Condensed from *Stahl und Eisen*, v. 68, nos. 17-18, 1948, p. 301-303.) Henry Brutcher, Altadena, Calif.

Particulars on spark streams of steels containing up to 0.60% C; best method of identifying spark images. Diagrams, graphs. 10 ref.

8368 Accuracy of Measurements of Corrosion Damage and of Wall Thickness by the Ultrasonic Method. A. Lutsch. *Henry Brutcher Translation No.* 3473, 15 p. (From *Zeitschrift Verein Deutscher Ingenieure*, v. 96, no. 23, 1954, p. 773-777.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 17998, v. 3, Dec. 1954.

8369 Air Gaging Proves Economical for Short Run Parts. C. K. Swafford. *Iron Age*, v. 175, Apr. 7, 1955, p. 129-131.

Air gages on grinders, boring mills, and superfinishing equipment are used to gage part tolerances of 0.0007 in. and less. Photographs.

8370* Gamma Radiography: A Nondestructive Testing Technique for Industrial Applications. **La gammagraphie: Une technique de contrôle non destructif d'emploi commode sur chantier et an atelier.** (French.) F. C. Fontenay. *Métaux Corrosion-Industries*, v. 30, no. 353, Jan. 1955, p. 9-17.

Characteristics of radiations from various radioisotopes; equipment and techniques. Photographs, table, gammagraph.

8371* Industrial X-Ray Fluoroscopic Apparatus Design. Charles A. Mitchell and Warren W. Inglis, Jr. *Nondestructive Testing*, v. 13, Mar.-Apr. 1955, p. 23-27.

Nondestructive Testing

Describes two types of industrial fluoroscopes in which an effort has been made to incorporate recent innovations for the examination of critical ordnance components. Diagrams, photographs, tables.

8372* X-Ray Inspection Methods in Plastics Fabrication. J. A. Neumann and F. J. Bockhoff. *Plastics Technology*, v. 1, Mar. 1955, p. 87-90.

Radiographic and fluoroscopic methods are delineated. Photographs, radiographs. 3 ref.

See also:

7742 (testing of enamel-metal composites)
8379 (use of radioisotopes in nondestructive testing)
8392 (use of X-rays in nondestructive testing)
8403 (testing by radiation methods)

NUCLEAR PHYSICS, NUCLEONICS, AND RADIATION

8373 Basic Safety Procedures in Reactor Operation. R. L. Doan. *American Society of Mechanical Engineers, Paper No.* 54–A-71, 1954, 8 p. + 1 plate. (TJ1 Am35p)

Review. Photographs, diagrams.

8374* Recording of Strong Primaries in Cosmic Radiation by a Dye Method. **Über den Nachweis von schweren Primären der kosmischen Strahlung mittels einer Farbstoffmethode.** (German.) J. Eugster. *Astronautica Acta*, v. 1, no. 1, 1955, p. 57-60.

The dye, triphenyl tetrazolium chloride (TTC), can supplement photographic plates. Graphs, photographs, table.

8375* Atomic Power for Britain. *Atomics (British)*, v. 6, Apr. 1955, p. 93-99, 118.

Includes photograph, diagrams.

8376* The Construction and Calibration of a 100-Curie Gamma Irradiator. A. Charlesby and O. Flint. *Atomics (British)*, v. 6, Apr. 1955, p. 100-107, 120.

Operation of a γ-source (ca 100 curies) of flexible and simplified design, fuelled with radioactive Co, is described. Diagrams, tables, graphs. 8 ref.

8377* Heat Transmission in the Atomic Power Plant. **Die Wärmeübertragung im Atomkraftwerk.** (German.) W. Lenz. *Brennstoff-Wärme-Kraft*, v. 7, no. 3, Mar. 1955, p. 114-118.

Heat-exchanger systems and equipment. Photographs, diagrams, tables. 8 ref.

8378 Uranium as Fissionable Material in Nuclear Reactors. K. Stokland and H. Chr. Neeb. *Henry Brutcher Translation No.* 3475, 15 p. (From *Forsvarets Forsknings, Institutt Arbok* III, 1950-1951, p. 17-27.) Henry Brutcher, Altadena, Calif.

Refining of U. Fabrication of U fuel rods. 8 ref.

8379 Metals Engineering and Radioactive Materials. G. G. M. Carr-Harris. *Canadian National Research Council, Technical Information Service Report No.* 42, Dec. 1954, 37 p. (Tl N21.27t)

Uses of radioisotopes in nondestructive testing, study of dynamic processes, and in various instruments. 175 ref.

8380* Britain's Atomic Power Projects. *Chemical & Process Engineering*, v. 36, Mar. 1955, p. 83-84, 91.

Describes Britain's ambitious program for the next decade. Photograph.

8381 Pilot Plant Built Around Million-Volt Generator Bombards Polyethylene With High-Energy Electrons. *Chemical Processing*, v. 18, Apr. 1955, p. 86-87.

Describes General Electric's Irrathene. Photographs.

8382 The Formation of Methyl Hydroperoxide From Methane Irradiated by X-Rays (200 kv.) in Aqueous Solution in the Presence of Dissolved Oxygen. G. R. A. Johnson and J. Weiss. *Chemistry & Industry*, 1955, no. 13, Mar. 26, p. 358-359.

Includes table, graph. 15 ref.

8383* Formation of π^0-Mesons by Protons With Energy of 670 M.E.V. in the Nuclei of Various Elements. **Obrazovanie π^0-mezonov protonami s energiei 670 Mev na iadrakh razlichnykh elementov.** (Russian.) A. A. Tiapkin, M. S. Kozodaev, and Iu. D. Prokoshkin. *Doklady Akademii Nauk SSSR*, v. 100, no. 4, Feb. 1, 1955, p. 689-692.

Release of γ-quanta and its relation to at. wt. Graphs. 5 ref.

8384* Probable Ionization of μ-Mesons in a Gas in the Impulse Range of $2 \cdot 10^8$-$1.2 \cdot 10^{10}$ e.v. per sec. **Veroiatnaia ionizatsiia μ-mezonov v gaze v intervale impul'sov $2 \cdot 10^8$-$1.2 \cdot 10^{10}$ ev/s.** (Russian.) V. A. Liubimov, G. P. Eliseev, V. K. Kosmachevskii, and A. V. Kovda. *Doklady Akademii Nauk SSSR*, v. 100, no. 5, Feb. 11, 1955, p. 883-886.

Mathematical treatment. Experimental results in accord with the Fermi-Budini theory of ionization losses of relativistic μ-mesons. Graph. 12 ref.

8385* Energy Transfer in Polystyrene-Anthracene. F. H. Krenz. *Faraday Society, Transactions*, v. 51, Feb. 1955, p. 172-183.

Preparation and study of X- and γ-ray irradiation of the polymer. Diagram, graphs, ultra-violet spectra. 26 ref.

8386* The Chemical Effects of Radiative Thermal Neutron Capture. III. Triphenylarsine and Triphenylstibine. A. G. Maddock and N. Sutin. *Faraday Society, Transactions*, v. 51, Feb. 1955, p. 184-196.

A chromatographic product separation. Tables, graphs, chromatogram, ultra-violet spectra. 24 ref.

8387* A Study of the Non-Linear Kinetics of the Chatillon Reactor. I. Theory. Harry J. Lipkin. *Journal of Nuclear Energy*, v. 1, Feb. 1955, p. 203-213.

Includes graphs.

8388 Scintillation Spectrometry of Low-Energy Bremsstrahlung. Margarete Ehrlich. *Journal of Research, National Bureau of Standards*, v. 54, Feb. 1955, p. 107-118.

Measurements of bremsstrahlung spectra from commercial X-ray tubes were made on an absolute scale, using a Tl-activated NaI crystal-scintillation spectrometer. Diagrams, tables, graphs. 54 ref.

8389 The High-Pressure Cloud-Chamber Cosmic-Ray Programme at La Marmolada. *Nature*, v. 175, Mar. 12, 1955, p. 445-448.

Describes a chamber operating at 75 atmospheres and at an elevation of 2020 m. Photographs, diagram.

8390* Safe and Economical Use of Isotopes in the Steel Industry. C. A. Karrer. *Nondestructive Testing*, v. 13, Mar.-Apr. 1955, p. 29-31.

Operation and physical layout of γ-ray testing equipment. Photographs.

8391 Reprocessing Reactor Fuels. H. A. Ohlgren, J. G. Lewis, and M. Weech. *Nucleonics*, v. 13, Mar. 1955, p. 18-21.

Recovery of fissionable materials from used reactor fuels by pulse-column solvent-extraction methods. Diagrams, graphs. 4 ref.

8392 Beta-Ray-Excited Low-Energy X-Ray Sources. L. Reiffel. *Nucleonics*, v. 13, Mar. 1955, p. 22-24.

Portability and stability permit extensive use in nondestructive testing. Graphs, diagrams, photograph.

8393 Mapping Radiation Fields With Silver-Activated Phosphate Glass. Herbert Rabin and William E. Price. *Nucleonics*, v. 13, Mar. 1955, p. 33-35.

Correction for fading in Ag-activated dosimeters. Diagram, photographs, graphs. 4 ref.

8394 X-Ray Critical-Absorption and Emission Energies in Kev. S. Fine and C. F. Hendee. *Nucleonics*, v. 13, Mar. 1955, p. 36-37.

Data for 100 elements. Table. 6 ref.

8395 Analyzing for Low-Energy Gamma Emitters in a Radionuclide Mixture. U. L. Upson, R. E. Connally, and M. B. Leboeuf. *Nucleonics*, v. 13, Apr. 1955, p. 38-42.

Measurement of Pu in the presence of considerable fission-product activity. Diagram, tables, graphs. 7 ref.

8396* Phenomenological Study of the New Particles. Λ-Particles and Λ-Nuclei. R. Gatto. *Nuovo cimento*, v. 1, ser. 10, no. 3, Mar. 1955, p. 372-393.

Includes table. 36 ref.

8397* Models of Hyperons. (English.) H. Enatsu and C. Ihara. *Nuovo cimento*, v. 1, ser. 10, no. 3, Mar. 1955, p. 394-402.

Considers the model of nucleon family and mass relations between various heavy particles. Tables. 20 ref.

8398 Radiation and Matter. A. N. Hambly. *Oil & Colour Chemists' Association, Journal*, v. 38, Mar. 1955, p. 121-128.

Review of the chemical effects of electromagnetic radiation. Diagrams. 11 ref.

8399* Basic Concepts of Experimental Nuclear Physics. **Osnovnye predstavleniia eksperimental'noi iadernoi fiziki.** (Russian.) S. Iu. Luk'ianov. *Priroda*, v. 44, no. 3, Mar. 1955, p. 11-31.

Atomic energy concepts; role of π-, μ- mesons, neutrinos, etc. Micrographs, table.

8400 Statistical Theory of Multiple Meson Production. Richard H. Milburn. *Reviews of Modern Physics*, v. 27, Jan. 1955, p. 1-14.

Includes diagrams, tables. 21 ref.

8401 Energy Levels of Light Nuclei. V. F. Ajzenberg and T. Lauritsen. *Reviews of Modern Physics*, v. 27, Jan. 1955, p. 77-166.

Summarizes currently available experimental information on the location and properties of the energy levels of the light nuclei from He^5 to Ne^{25}. Diagrams, tables, graphs. 947 ref.

8402 Properties and Uses of Radioisotopes. G. D. Calkins. Paper from SYMPOSIUM OF RADIOACTIVITY—AN INTRODUCTION. ASTM Special Technical Publication No. 159. p. 3-8. 1954. American Society for Testing Materials, Philadelphia. (QC795 Am35s)

General nature of radioactive decay; sources of radioisotopes; applications in science and industry. Table.

8403* The Importance of Radioactive Radiation to Materials Science. **Die Bedeutung radioaktiver Strahlung für die Werkstoffkunde.** (German.) P. Müller. *VDI Zeitschrift*, v. 97, no. 5, Feb. 11, 1955, p. 138-144.

Effect of various types of radiation on the properties of metals, plastics, ionic crystals, glasses, and liquids; use of radioactive rays and radioactive tracers in testing materials. Photographs, graphs, table. 18 ref.

8404* The Significance of an Electron Bombardment for the Plasticity of Metal Crystals. **Über die Bedeutung eines Elektronenbombardements für die Plastizität von Metallkristallen.** (German.) Erich Schmid and Karl Lintner. *Zeitschrift für Metallkunde*, v. 46, no. 2, Feb. 1955, p. 71-76.

Review of the Seitz-Brinkman theory on the effect of corpuscular radiation on solid bodies; effect of radiation on the ductility of crystals; flow tests on Zn crystals under radiation. Graphs, tables. 23 ref.

Books and Miscellaneous Publications

8405 Applied X-Rays. George L. Clark. International Series in Pure and Applied Physics. 4th Ed. 843 p. 1955. McGraw-Hill, New York. (QC481 C54a4)

General physics and applications of X-radiation. X-ray analysis of the ultimate structures of materials.

8406 Nuclear Physics. Alex E. S. Green. International Series in Pure and Applied Physics. 535 p. 1955. McGraw-Hill, New York. (QC173 G82n)

Comprehensive presentation of the essentials of nuclear physics devoted primarily to theories and experiments which are concerned with the detailed characteristics, behavior, and internal structure of nuclei.

8407 Radioisotope Conference, 1954. J. E. Johnston, editor. v. I. Medical and Physiological Applications. 418 p. 1954. v. II. Physical Sciences and Industrial Applications. 223 p. 1954. Butterworths Scientific Publications, London. (QC798 R11p2)

Collection of 70 papers covering medical, physiological, and industrial applications of radioactive materials and techniques.

8408 Electron and Nuclear Counters. Serge A. Korff. 2nd Ed. 363 p. 1955. D. Van Nostrand Co., New York. (QC701 K84e2)

Ionization chambers; proportional, Geiger, and scintillation counters.

8409* Numerical Tables of Nuclear Physics. (English and French.) Charles Noël Martin. 238 p. 1954. Gauthier-Villars, Paris. (QC783 M36n)

Reference book for use in comparing actual data with values obtained from theoretical studies.

8410 Introduction to Atomic and Nuclear Physics. Henry Semat. 3rd Rev. Ed. 561 p. 1955. Rinehart & Co., New York. (QC173 Se52i3.)

Presentation of important experimental data upon which are based our present ideas of the structure of the atom.

8411 The New Atomic Energy Law—What It Means to Industry. 181 p. 1954. Atomic Industrial Forum, New York. (QC798 At71n)

Explanations of various aspects of the law and opportunities it offers to private enterprise as interpreted by 22 authorities.

8412 Symposium on Radioactivity — An Introduction. ASTM Special Technical Publication No. 159. 46 p. 1954. American Society for Testing Materials, Philadelphia. (QC795 Am35s)

Six papers on measurement uses and handling techniques for radioisotopes.

See also:

7451 (radiation effects on plants)
7476 (biological effects of gamma irradiation)
7507 (biological effects of radiation)
7510 (radiation effects on quartz)
7514 (nuclear shielding with concrete)
7568 (radioactive tracers)
7686 (irradiation effects on KNO_3)
7689 (catalyzed S^{35} exchange reactions)
7693 (radiation effects on chemical reactions)
7833 (nuclear power)
8005 (zinc isotopes in tissues)
8083 (liquid metals in nuclear reactors)
8226 (radiation)
8330 (radiation effects on alloys)
8370 (radiography)
8465 (unified theory of elementary particles)

OPERATIONS RESEARCH AND MANAGEMENT ENGINEERING

8413 New Concepts in Process Control. J. M. Ham. *Canadian Chemical Processing*, v. 39, Feb. 1955, p. 72, 74, 76.

Theory of conditional feedback control. Diagrams. 4 ref.

8414 Human Frailties vs. Your Safety. H. Les Bullock. *Chemical Engineering*, v. 62, Apr. 1955, p. 176-179.

Examples of six deadly failings.

8415 Write Better—And You Will Publish More. Jay R. Gould. *Chemical Engineering*, v. 62, Apr. 1955, p. 216, 218, 220, 222.

Stresses nine points to consider when writing a paper.

8416 The Meaning of Organization. John R. Sargent. *Chemical Engineering Progress*, v. 51, Mar. 1955, p. 151-154.

Principles and application of managerial organization. Charts. 1 ref.

8417 Research From a Management Viewpoint. Perkin Medal Address. Roger Williams. *Chemistry & Industry*, 1955, no. 11, Mar. 12, p. 264-266.

Address is based on 30 yr. experience in management.

Operations Research and Management Engineering

8418 Keep the Right Kind of Records to Protect Your Patentable Ideas. Leonard H. King. *Control Engineering*, v. 2, Apr. 1955, p. 67-69.

Tips to safeguard possible inventions.

8419 The Safety of Pressure Vessels. Sydney D. Scorer. *Industrial Chemist and Chemical Manufacturer*, v. 31, Mar. 1955, p. 135-137.

Reviews design details of various vessels.

8420 Assessment of Quality of Wrought Products. W. G. Shilling. *Institute of Metals, Journal*, v. 83, Feb. 1955, p. 193-198.

Inspection procedures; sampling; nondestructive testing.

8421 The Control of Quality in Heat-Treatment and Final Operations in the Production of Rolled, Extruded, and Drawn Aluminium and Aluminium Alloys. A. J. Field and J. Salter. *Institute of Metals, Journal*, v. 83, Feb. 1955, p. 199-220.

Factors that should be controlled to insure satisfactory quality in the finished product. Operations covered include sheet shearing from coil, flattening, finish, shearing, slitting, blanking, straightening of sections, drawing and finishing of tubes, inspection and packing. Tables, diagram. 10 ref.

8422 The Control of Quality in the Heat-Treatment and Finishing of Copper and Copper-Base Alloys. V. B. Hysel and T. W. Collier. *Institute of Metals, Journal*, v. 83, Feb. 1955, p. 233-246 + 1 plate.

Inspection and controls for heat treating, shearing, straightening, cutting to length, and removal of burrs. Tables, micrographs, photographs. 6 ref.

8423* The Organization of Paint Research in the Netherlands and Some Investigations by the Paint Research Institute T.N.O. H. W. Talen. *Official Digest. Federation of Paint and Varnish Production Clubs*, v. 27, Jan. 1955, p. 24-41.

Extent of Dutch paint research; results of extensive tests. Diagrams, tables, photographs, graphs.

Books and Miscellaneous Publications

8424 Timestudy for Cost Control. Phil Carroll. 3rd. Ed. 301 p. 1954. McGraw-Hill, New York. (T60.T5 C23t3)

Selection of personnel for timestudy work and procedures on how and when to start.

8425 Principles of Management. Harold Koontz and Cyril O'Donnell. 664 p. 1955. McGraw-Hill, New York. (HD31 K83p)

Organization; staffing; planning; control measures.

8426 Patent Law in the Research Laboratory. John Kenneth Wise. Reinhold Pilot Book No. 4. 145 p. 1955. Reinhold Publishing Corp., New York. (T215 W75p)

A practical insight into the workings of the patent system.

8427 Manpower Resources in the Earth Sciences. 75 p. 1954. National Science Foundation, U. S. Government Printing Office, Washington, D. C. (HD5723 N21.3m)

Tabular data from a survey of the professions of geology, geophysics and meteorology.

See also:

7459 (research planning in agriculture)
7685 (industrial detergents)
8186 (quality control of castings)
8500 (quality control of plastics)

ORE AND MATERIALS BENEFICIATION

8428 A Test for Sinter Quality. W. Küntscher and J. Holzhey. *Henry Brutcher Translation No.* 3426, 9 p. (Part from *Metallurgie und Giessereitechnik*, v. 4, no. 10, 1954, p. 435-439.) Henry Brutcher, Altadena, Calif.

Reducibility of sintered iron ores. Table, diagram, photograph, graph. 1 ref.

8429 Uranium Concentration With the Driessen Cone. E. O. Lilge, I. C. Edwards, and H. H. McCreedy. *Canadian Mining and Metallurgical Bulletin*, v. 48, no. 515, Mar. 1955, p. 133-139; *Canadian Institute of Mining and Metallurgy, Transactions*, v. 58, 1955, p. 83-89.

Effect of equipment parameters on results. Graphs, table.

8430* Charge-Preparation Plant for the Blast Furnaces at Mont-Saint-Martin. Apprêt de la charge des hauts fourneaux de Mont-Saint-Martin. (French.) Aubert. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques*, v. 12, no. 2, 1955, p. 321-343.

Crushing of ores, gathering of fines, and dedusting of gas. Photographs, flowsheet, tables.

8431 An Agglomeration Process for Iron Ore Concentrates. W. F. Stowasser. *Iron and Steel Engineer*, v. 32, Mar. 1955, p. 112-115; disc., p. 115.

Pilot plant process of balling the concentrates and burning these balls on a continuous horizontal grate. Photographs, diagram.

8432 Chemistry of the Ammonia Pressure Process for Leaching Ni, Cu, and Co From Sherritt Gordon Sulphide Concentrates. F. A. Forward and V. N. Mackiw. *Journal of Metals*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 203, Mar. 1955, p. 457-463.

Laboratory and pilot plant studies on high grade Ni concentrate produced from Lynn Lake ores. Graphs, diagrams. 21 ref.

8433 Acid Pressure Leaching of Uranium Ores. F. A. Forward and J. Halpern. *Journal of Metals*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 203, Mar. 1955, p. 463-466.

A new process is described for extracting U from ores containing sulphidic minerals, by treating an aqueous pulp of the ore with air or O at elevated temperatures and pressures. Graphs. 5 ref.

8434 Electrical Conduction in Molten Cu-Fe Sulphide Mattes. G. M. Pound, G. Derge, and G. Osuch. *Journal of Metals*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 203, Mar. 1955, p. 481-484.

Investigation of mode of electrical conduction as an aid in structure determinations. Diagrams, tables, graph, circuit diagram. 16 ref.

8435 Beneficiation Moves Forward. Norman Weiss and Stanley D. Michaelson. *Mining Engineering*, v. 7, Mar. 1955, p. 257-264.

Review of progress in 1954. Photographs.

8436 Beneficiation Studies of Columbium-Tantalum-Bearing Minerals in Alluvial Black-Sand Deposits. J. E. Shelton and W. A. Stickney. *U. S. Bureau of Mines, Report of Investigations* 5105, Feb. 1955, 16 p. (TN21 Un3r)

Experimental study of the effects of attrition scrubbing, sizing, magnetic, electrostatic, and gravity separation on the concentration of Cb-Ta-bearing alluvial sands from Idaho. Tables, flow charts.

Books and Miscellaneous Publications

8437 Mineral Engineering Techniques. F. J. Van Antwerpen, editor. Chemical Engineering Progress Symposium Series, no. 15, v. 50, 96 p. 1954. American Institute of Chemical Engineers, New York. (TN500 Am35m)

Fifteen papers on ore beneficiation equipment and procedures.

8438 Correlation Chart of Uranium Bearing Minerals. Colorado School of Mines Research Foundation, Golden, Colo. (Pamphletfile)

Wall chart, 50" x 32", contains over 160 U-bearing minerals; divided into vertical chemical-radical columns, and horizontally into chemical-element bands of different colors for visual ease of correlation. Each mineral is contained in a printed box with the mineral's characteristics for definite identification.

See also:

7560 (phosphate ore concentration)

PHYSICS

8439 Interference Patterns in Reverberant Sound Fields. Richard V. Waterhouse. *Acoustical Society of America, Journal*, v. 27, Mar. 1955, p. 247-258.

It is shown that the sound energy is distributed into interference patterns at the reflecting boundaries of a field. Graphs, diagrams, tables. 5 ref.

8440 Ultrasonic Dispersion in 1,1- and 1,2-Dichloroethane Vapors. T. Seshagiri Rao and J. C. Hubbard. *Acoustical Society of America, Journal*, v. 27, Mar. 1955, p. 321-325.

Measurements using an ultrasonic resonator interferometer. Tables, graphs. 16 ref.

8441 Color and Chemical Constitution. Wallace R. Brode. *American Scientist*, v. 43, Apr. 1955, p. 259-284.

Color's value in chemical evaluation. Tables, graphs, diagrams, spectra, photographs. 11 ref.

8442 Heat Transfer and Temperature Distribution in Laminar Film Condensation. W. M. Rohsenow. *American Society of Mechanical Engineers, Paper No.* 54-A-144, 1954, 6 p. + 1 plate. (TJ1 Am35p)

Includes diagrams. 5 ref.

8443 Effect of Vapor Velocity on Laminar and Turbulent Film Condensation. W. M. Rohsenow, J. H. Webber, and A. T. Ling. *American Society of Mechanical Engineers, Paper No.* 54–A-145, 1954, 12 p. + 2 plates. (TJ1 Am35p)

Analyses showing the effect on rates of condensation of vapor shear stress at the liquid-vapor interface. Graphs. 10 ref.

8444 Remarks on the Mechanism and Stability of Surface-Boiling Heat Transfer. Frank Kreith and Alan S. Foust. *American Society of Mechanical Engineers, Paper No.* 54-A-146, 9 p. + 1 plate. (TJ1 Am35p)

Some recent theories of nucleate boiling are critically analyzed. New criteria for the stability limits of boiling heat transfer. Graphs. 10 ref.

8445 The Economics of Heat-Exchanger Design. W. C. Beekley. *American Society of Mechanical Engineers, Paper No.* 54–A-179, 1954, 14 p. (TJ1 Am35p)

Reviews the current state of the process heat-exchanger art and suggests a program for reducing production costs. Graph.

8446* Hyperfine Structure of Ytterbium. **Zur Hyperfeinstruktur des Ytterbiums.** (German.) K. Krebs and H. Nelkowski. *Annalen der Physik*, v. 15, no. 2, 1954, p. 124-134.

With highest possible precision, the structure of the Yb-line, f=6489 Å, is proven. Tables, diagrams, photographs. 34 ref.

8447* A Twin-Lever Ceramic Cartridge. B. B. Bauer, L. Gunter, and E. Seeler. *Audio Engineering Society, Journal*, v. 2, Oct. 1954, p. 239-243.

Description of high fidelity phonograph pick-up cartridge employing ceramic element. Diagrams, photographs, graphs. 2 ref.

8448* Photoelectric Effect of Selenium Thermocouples at Low Temperatures. **L'effet photoélectrique des photopiles au sélénium aux basses températures.** (French.) Georges Blet. *Comptes rendus*, v. 240, no. 9, Feb. 28, 1955, p. 962-963.

Results of study made between 22 and −185 C. Graphs. 8 ref.

8449 The Equation of Polytropic Process of Real Gases. Dragomir Malic. *Franklin Institute, Journal*, v. 259, Mar. 1955, p. 235-238.

Derivation of equation.

8450* Collective Electron Theory of Antiferromagnetism. (English.) Takeo Matsubara. *Hokkaidō University, Faculty of Science, Journal*, ser. 2, v. 4, Nov. 1954, p. 292-304.

A theory is developed on the basis of the Hartree-Fock approximation to provide a quantum statistical formulation of antiferromagnetism. Graphs. 5 ref.

8451* Studies on the Freezing of Water. II. Formation of Disc Crystals. (English.) Kiyoshi Arakawa. *Hokkaidō University, Faculty of Science, Journal*, ser. 2, v. 4, Nov. 1954, p. 311-339 + 10 plates.

Physical conditions for production of crystals; forms and surface phenomena of growing crystals; mechanism of anchor-ice formation. Diagrams, tables, graphs, micrographs. 18 ref.

8452 A Survey of Magnetic Amplifiers. Carroll W. Lufcy. *I.R.E., Proceedings*, v. 43, Apr. 1955, p. 404-413.

Basic operation, along with certain fundamental circuits which represent present and potential applications, are discussed, indicating the range and usefulness of magnetic amplifiers. Diagrams, circuit diagrams, photographs. 26 ref.

8453 Fine Structure of the 2.7 Micron Carbon Dioxide Rotation-Vibration Band. W. L. France and F. P. Dickey. *Journal of Chemical Physics*, v. 23, Mar. 1955, p. 471-474.

Includes tables, spectrogram. 4 ref.

8454 Luminescence Produced as a Result of Intense Ultrasonic Waves. Virginia Griffing and Daniele Sette. *Journal of Chemical Physics*, v. 23, Mar. 1955, p. 503-509.

Studies of water solutions and organic liquids in the frequency range 0.66 to 2.0 Mc. per sec. Diagrams, photograph, graphs, tables. 9 ref.

8455 Electron Diffraction Determination of Lattice Parameters of Polycrystalline Specimens Giving Broad Diffraction Peaks. I. Discussion of Technique and Analysis of Errors. II. A Study of Nickel Oxide. G. G. Libowitz and S. H. Bauer. *Journal of Physical Chemistry*, v. 59, Mar. 1955, p. 209-217.

Includes tables, graphs, diagram. 34 ref.

8456 An Experiment on the Inhibition of Thermal Convection by a Magnetic Field. Yoshinari Nakagawa. *Nature*, v. 175, Mar. 5, 1955, p. 417-419.

Covers theory and measurement in Hg. Table, graphs. 8 ref.

8457 Electron Diffraction Pattern of Mica of Various Thicknesses. Tadatosi Hibi. *Nature*, v. 175, Mar. 12, 1955, p. 475-476.

Includes electron diffractograms. 4 ref.

8458 Studies on the Image Formed by Lenses. I. On the Characteristics of an Image and Their Quantitative Representation. Goro Kuwabara. *Optical Society of America, Journal*, v. 45, Apr. 1955, p. 309-319.

Intensity distributions of light in the images of a luminous line and a surface boundary formed by lenses with spherical aberration were measured by means of photoelectric photometry. Diagrams, test pattern, graphs, table. 12 ref.

8459* Electrical Conductivity and Thermo-Electric Motive Force in MgO Single Crystal. (English.) E. Yamaka and K. Sawamoto. *Physical Society of Japan, Journal*, v. 10, no. 3, Mar. 1955, p. 176-179.

Includes table, diagrams, graphs. 6 ref.

8460* On the Resistivity and Crystal Structure of Binary Oxide of Nickel and Cobalt. (English.) Tamio Sakata, Kimiko Sakata, and Kunihiko Kigoshi. *Physical Society of Japan, Journal*, v. 10, no. 3, Mar. 1955, p. 179-186.

Resistivity measurement during the heat treatment provided a convenient measure of the phase change. Table, diagrams, graphs. 9 ref.

8461 Photoconductivity in Calcium Tungstate. J. R. Cook. *Physical Society, Proceedings*, v. 68, no. 423B, Mar. 1955, p. 148-155.

Studies using artificial single crystals and an intense ultraviolet source. Diagram, graphs. 6 ref.

8462 Microwave Spectroscopy of Gases. J. Sheridan. *Research*, v. 8, Mar. 1955, p. 88-93.

Measurements made at wave lengths less than one mm., providing information on internuclear distances, electronic structures, molecular and nuclear properties, and collision processes. Spectra. 75 ref.

8463 Absorption and Velocity of Sound in Vapors. E. G. Richardson. *Reviews of Modern Physics*, v. 27, Jan. 1955, p. 15-25.

Physics

Critical analysis of published experimental data. Review of equipment and experimental procedures. Graphs, table. 100 ref.

8464 Symmetry of Physical Laws. I. Symmetry in Space-Time and Balance Theorems. II. Q-Number Theory of Space-Time Inversions and Charge Conjugation. Satosi Watanabe. *Reviews of Modern Physics*, v. 27, Jan. 1955, p. 26-76.

Includes tables. 57 ref.

8465 Attempts at a Unified Theory of Elementary Particles. Hideki Yukawa. *Science*, v. 121, Mar. 25, 1955, p. 405-408.

Mathematical development. 8 ref.

8466 Review of Experimental Investigations of Liquid-Metal Heat Transfer. Bernard Lubarsky and Samuel J. Kaufman. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3336, Mar. 1955, 115 p. (TL570 Un3t)

Theoretical analysis of published experimental data. Considerable spread was observed between the experimental results and the predictions of theoretical calculations. Graphs, tables. 41 ref.

8467* Constitution of Solutions. **Struktura rastvorov.** (Russian.) G. B. Bokii. *Uspekhi Khimii*, v. 23, no. 5, 1954, p. 605-613.

Formation of solid solutions, factor of spatial relationship of elements, and isostructural factor. Structure of pure liquids, coordination number, eutectic structure, and effect of crystalline structure on properties of solutions. 28 ref.

8468* Length of the Free Path of the Unlocalized Exciton in the Atomic Crystal. **Dlina svobodnogo probega nelokalizovannogo eksitona v atomnom kristalle.** (Russian.) A. I. Ansel'm and Iu. A. Firsov. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki*, v. 28, no. 2, Feb. 1955, p. 151-159.

Effects of thermal vibrations of the lattice. Role of phonon. Graphs. 14 ref.

8469* Problem of Superconductivity of Bi_4Rh and Bi_2Rh Compounds. **K voprosu o sverkhprovodimosti soedinenii Bi_4Rh and Bi_2Rh.** (Russian.) N. E. Alekseevskii, G. S. Zhdanov, and N. N. Zhuravlev. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki*, v. 28, no. 2, Feb. 1955, p. 237-240 + 1 plate.

Temperature of passage into superconductive state for crystals of β- and γ-Bi_4Rh. Reasons for the unstable behavior of Bi-Rh alloys. Micrographs. 5 ref.

Books and Miscellaneous Publications

8470 Contributions to the Theory of Partial Differential Equations. L. Bers, S. Bochner, and F. John, editors. Annals of Mathematics Studies No. 33. 257 p. 1954. Princeton University Press, Princeton, N. J. (QA371 B46c)

Analysis of elliptic, parabolic, and hyperbolic systems.

8471 Sound Insulation and Room Acoustics. Per V. Brüel. (Translated from the Danish by J. M. Borup.) 275 p. 1951. Chapman & Hall, London. (TH1725 B83s)

A survey to give civil engineers and architects some idea of the acoustic laws and enable them to share in the progress which was made in the practical application of those theories.

8472 Statistical Theory of Extreme Values and Some Practical Applications. Emil J. Gumbel. National Bureau of Standards, Applied Mathematics Series 33. 51 p. 1954. Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. (QA273 Un3.5a)

Extreme-value statistical methods and practical applications.

8473 Mathematics of Engineering Systems. Derek F. Lawden. 380 p. 1954. John Wiley & Sons, New York. (QA371 L41m)

Analytic methods of solving various mechanical systems.

8474 Introduction to Thermodynamics of Irreversible Processes. I. Prigogine. American Lecture Series. A Monograph in American Lectures in Biochemistry and Biophysics. 115 p. 1955. Charles C. Thomas, Springfield, Ill. (QC311 P93i)

Thermodynamics of physico-chemical processes.

8475 Advanced Mathematics for Engineers. H. W. Reddick and F. H. Miller. 3rd Ed. 548 p. 1955. John Wiley & Sons, New York. (QA37 R24a3)

Presents definitions, statements of physical laws, theorems, and problem and answer lists pertaining to civil, mechanical, electrical, and chemical engineering.

8476 Multipole Fields. M. E. Rose. Structure of Matter Series. 99 p. 1955. John Wiley & Sons, New York. (QC670 R72m)

The central theme is the angular-momentum and parity properties of the multipole fields. Deals with the general development of the multipole fields and their applications.

8477 Selected Papers in Statistics and Probability. Abraham Wald. 702 p. 1955. McGraw-Hill, New York. (QA276 W14se)

Covers Wald's work in probability, non-parametric inference, the Neyman-Pearson system of statistical inference, theory of regression, analysis of variance, and other allied papers.

8478 Vacuum Symposium Transactions. 147 p. 1954. Committee on Vacuum Techniques, Boston. (QC166 V13.9)

Thirty-five papers covering new equipment and instrumentation, methods and techniques, and applications and processes in vacuum technology.

8479 Higher Transcendental Functions. Bateman Manuscript Project. v. III. 292 p. 1955. McGraw-Hill, New York. (QA 351 B31h)

Reference on advanced mathematics useful in many fields of engineering, physics, and mathematics.

8480 Tables of Functions and of Zeros of Functions. National Bureau of Standards, Applied Mathematics Series 37. 211 p. 1954. Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. (QA55 Un3.5a)

Mathematical tables for various exponential, integral, and differential equations.

See also:

7508 (ultrasonic attenuation applications biased)
7578 (differential measurements of reflectance)
7618 (mass spectroscopy)
7886 (acoustic measurement)
8014 (surface temperature measurement)

PLASTICS

8481 Polymers. Arthur V. Tobolsky. *American Scientist*, v. 43, Apr. 1955, p. 344-355.

A survey.

8482 Molecular Engineer. *Chemical Week*, v. 76, Apr. 2, 1955, p. 36, 38, 40.

Herman Mark defines the man and his work.

8483 Plasticizers: Treble Output in Twenty Years? Irving Skeist. *Chemical Week*, v. 76, Apr. 16, 1955, p. 40-57.

Discusses market, various types of plasticizers; tabulates about 600 plasticizers by type, manufacturer, trade name, price, density, and mol. wt. Graphs.

8484* Heats of Solution of Polystyrenes With Different Molecular Weights and the Density of Rigid Chains "Packing". **Teploty rastvoreniia polistirolov razlichnogo molekuliarnogo vesa i plotnost' upakovki zhestkikh tsepei.** (Russian.) A. A. Tager, R. V. Krivokorytova, and P. M. Khodorov. *Doklady Akademii Nauk SSSR*, v. 100, no. 4, Feb. 1, 1955, p. 741-743.

Characteristics viscosities in benzene and ethylbenzene. Table, graph. 4 ref.

8485* Catalytic Copolymerization of Unsaturated Compounds. Copolymerization of Systems: Isoprene-Styrol, Isoprene—α-methylstyrol. **Sovmestnaia kataliticheskaia polimerizatsiia nenasyshchennykh soedinenii. Sovmestnaia polimerizatsiia sistem. Izopren—stirol, izopren—α-metilstirol.** (Russian.) T. E. Lipatova, A. R. Gantmakher, and S. S. Medvedev. *Doklady Akademii Nauk SSSR*, v. 100, no. 5, Feb. 11, 1955, p. 925-928.

Includes graphs, table. 8 ref.

8486* Solvent Participation in Radical Chain Reactions. I. Kinetic Analysis. II. Rates of Polymerization in Benzene Solution. III. ϕ-Factors in Solution Polymerization. G. M. Burnett and L. D. Loan. *Faraday Society, Transactions*, v. 51, Feb. 1955, p. 214-230.

Includes tables, graphs. 43 ref.

8487* The Light-Scattering and Non-Newtonian Viscosity of High Molecular Weight Polymethacrylic Acid. P. Alexander and K. A. Stacey. *Faraday Society, Transactions*, v. 51, Feb. 1955, p. 299-308.

Anomaly explained by mol. distortion. Graphs. 17 ref.

8488* The Study of Transition in High Polymers by Photoelastic Method. (English.) Motozo Kaneko, Rokuro Murai, Kei Kishi, and Dai Mori. *Hokkaidō University, Faculty of Science, Journal*, ser. 2, v. 4, Nov. 1954, p. 305-310.

The transition point can be determined by the relationship between temperature and photoelasticity. Graphs. 4 ref.

8489 Polymerizable Derivatives of Long-Chain Fatty Acids. Vinyl Stearate and Copolymerization of Vinyl Chloride With Other Vinyl Esters. William S. Port, Edmund F. Jordan, Jr., William E. Palm, Lee P. Witnauer, John E. Hansen, and Daniel Swern. *Industrial and Engineering Chemistry*, v. 47, Mar. 1955, pt. 1, p. 472-480.

Copolymers behave similarly to externally plasticized compositions. Plasticizer efficiency depends on chain length. Tables, graphs. 28 ref.

8490* Polymerization of Vinyl Acetate at Low Temperatures. G. M. Burnett, M. H. George, and H. W. Melville. *Journal of Polymer Science*, v. 16, Mar. 1955, p. 31-44.

Polymers prepared at −40 C to obtain compounds with linear characteristics. Their behavior in solution is examined by light scattering and osmotic methods. Graphs, tables, diagram. 15 ref.

8491* Polyamide Resins and Their Industrial Applications. **Poliamidnye smoly i ikh primenenie v promyshlennosti.** (Russian.) K. N. Vlasova. *Khimicheskaia Promyshlennost'*, 1954, no. 8, Dec., p. 470-477.

Reactions; preparation; physical-chemical properties. Graphs, tables. 28 ref.

8492* Determination of the Pressure in Plastics in an Injection Molding Machine. **Opredelenie davleniia, plastmassy v lit'evoi mashine.** (Russian.) N. A. Chelobov and M. P. Osipova. *Khimicheskaia Promyshlennost'*, 1954, no. 8, Dec., p. 477-479.

Electrical apparatus for measuring pressure at various stages of forming operations. Design of nozzle and injection molds. Circuit diagrams, diagrams, graphs.

8493* Urgent Extrusion Problems. **Akute Probleme beim Strangpressen.** (German.) H. Reifenhäuser. *Kunststoffe*, v. 45, no. 3, Mar. 1955, p. 93-97.

Latest developments in the field of processing plastic materials. Diagrams, photographs.

8494 Review of Plastics Developments in 1953-1954. F. J. McGarry. *Mechanical Engineering*, v. 77, Apr. 1955, p. 318-320, 332.

New materials, properties, fabrication procedures, and applications. 127 ref.

8495* "Plasticizers". **Zum Begriff "Weichmachungsmittel".** (German.) K. Thinius. *Plaste und Kautschuk*, v. 2, no. 2, Feb. 1955, p. 26-27.

Definition, function, and characteristics of different types of plasticizers.

8496* Plastic Tooling for Plastic Parts. Walter Brenner and Eugene Singer. *Plastics Technology*, v. 1, Feb. 1955, p. 20-26.

Properties and application of this versatile technique. Tables, photographs.

8497* Weathering Properties of Vinyl Plastics. John G. Hendricks. *Plastics Technology*, v. 1, Mar. 1955, p. 81-85, 90. Interaction of several variables required for performance. Tables, graphs, photographs.

8498* Isocyanates—Their Formation, Reactions, and Applications. R. D. Hirschbeck. *Plastics Technology*, v. 1, Mar. 1955, p. 95-99.

Step-by-step description of the chemistry involved. 28 ref.

8499* Radiation and the Polymer Industry. *Radiation Applications*, 1955, Mar., 8 p.

Effects of radiation on plastics and resins. Tables. 18 ref.

8500 Quality Control of Vinyl and Polyethylene Electrical Insulating and Jacketing Materials. R. C. Boyd. *Rubber Age*, v. 76, Mar. 1955, p. 882-884.

Initiation of a quality control system. Tables, diagram, photographs.

8501 The Use of Ethoxyline Resins in Modern Tool Manufacture. K. Meyerhans. *Sheet Metal Industries*, v. 32, no. 335, Mar. 1955, p. 165-172; disc., p. 172-175.

Properties of resins. Uses in manufacture of blanking, piercing, and forming dies. Tables, diagrams.

8502* Reaction of Polyvinylchloride Polymers With Pyridine. **Zur Reaktion von Polyvinylchloridpolymeren mit Pyridin.** (German.) Hans Freytag. *Zeitschrift für analytische Chemie*, v. 145, no. 1, 1955, p. 24-26.

Improved method of determining PVC. 9 ref.

Books and Miscellaneous Publications

8503 Emulsion Polymerization. F. A. Bovey, I. M. Kolthoff, A. I. Medalia, and E. J. Meehan. A Series of Monographs on the Chemistry, Physics and Technology of High Polymeric Substances. v. IX. 445 p. 1955. Interscience Publishers, New York. (QD281.P6 B66e)

Initiation systems; micelles; kinetics. GR-S recipes.

8504 Glass Reinforced Plastics. Phillip Morgan, editor. 248 p. 1954. Philosophical Library, New York. (TP986 M82g)

Glass fiber forms and properties; polymer production; applications.

See also:

7554 (coumarone indene resin production)
7586 (cellulose acetate analysis)
7636 (polymerization sensitizers)
7667 (thermal polymerization)
7748 (plastics for coatings)
7778 (printing of polyethylene)
7846 (use of plastics)
7986 (plastics in the printing industry)
8372 (inspection of plastics)
8381 (irradiation of plastics)
8385 (polymer irradiation)

POLLUTION AND WASTES

8505 Industrial Waste Control. D. Gardner Foulke. *American Electroplaters' Society, Proceedings*, v. 41, 1954, p. 63-65. (TS670 Am35p)

Research being devoted to the problem of stream pollution abatement.

8506 Design Aspects of an Electrostatic Precipitator for the Collection of Small Solids Ahead of the Air Heater. H. Klemperer and J. E. Sayers. *American Society of Mechanical Engineers, Paper No.* 54-A-248, 1954, 16 p. + 9 plates. (TJ1 Am35p)

Development of electrostatic precipitator which operates in the temperature range between 500 to 750 F, at a gas velocity of 40 ft. per sec. Diagrams, photographs, oscillogram, flowsheet.

8507 Effect of Fly Ash Characteristics on Collector Performance. H. J. White. *American Society of Mechanical Engineers, Paper No.* 54-A-259, 34 p. + 4 plates. (TJ1 Am35p)

Includes micrographs, tables, graphs. 11 ref.

8508 Waste Treatment Methods—Recovery and Disposal. H. L. Jacobs. *Chemical Engineering*, v. 62, Apr. 1955, p. 184-188.

A 1955 survey of treatment by ten different techniques.

Pollution and Wastes

8509* The Role of Insects in Sewage Disposal Beds. (English.) R. L. Usinger and W. R. Kellen. *Hilgardia*, v. 23, Jan. 1955, p. 263-321.

By reducing the growth on the filter stones the larvae prevent clogging and permit a more vigorous and efficient growth to develop. Tables, photographs, diagram, graphs. 8 ref.

8510 New Process Washes Coke Oven Gas With Waste Pickle Liquor. T. E. Dixon. *Iron Age*, v. 175, Mar. 24, 1955, p. 91-93.

Simultaneous removal of ammonia, hydrogen sulphide, and hydrogen cyanide from coke oven gas is now done by washing them out with the waste pickle liquor from steel plants. Flow chart.

8511 Air Pollution Effects, Pattern of Damage Produced on Vegetation by Smog. W. M. Noble. *Journal of Agricultural and Food Chemistry*, v. 3, Apr. 1955, p. 330-332.

Includes photographs. 15 ref.

See also:

7576 (air pollution)
7583 (air pollution analysis)
7991 (fly ash collectors)
8158 (dust collection)

RUBBER AND ELASTOMERS

8512 Filler Phenomena in Silicone Rubber. E. L. Warrick and P. C. Lauterbur. *Industrial and Engineering Chemistry*, v. 47, Mar. 1955, pt. 1, p. 486-491.

Behavior in silicone parallels action in organic rubbers. Role of fillers is still nebulous. Table, graphs, diagram, X-ray diffractograms. 16 ref.

8513 Effect of Milling on Branching and Distribution of Hot GR-S. W. K. Taft and June Duke. *Industrial and Engineering Chemistry*, v. 47, Mar. 1955, pt. 1, p. 496-500.

Milling at 90 to 180 F does not change the mol. wt. ratio, but increases undesirable chain branching. Tables, graphs. 11 ref.

8514 Industrial Rubber Hose: How to Increase Service Life, Lower Costs. C. M. Scholz. *Iron Age*, v. 175, Mar. 17, 1955, p. 103-105.

Types of hose; components; maintenance pointers. Photographs.

8515 Evidence for a Hydrochlorination Retarder Within Natural Rubber Latex Particles. Manfred Gordon and James S. Taylor. *Journal of Applied Chemistry*, v. 5, Feb. 1955, p. 62-64.

Kinetic evidence is presented for the occurrence in *Hevea* latex particles of a trace substance that retards the hydrochlorination reaction. Graphs. 6 ref.

8516* Particle Size Distribution in Brominated Hevea Latices. Th. G. F. Schoon and G. J. van der Bie. *Journal of Polymer Science*, v. 16, Mar. 1955, p. 63-88.

Investigates variations existing in particle size characteristics in clonal lattices. Micrographs, tables, graphs, diagram, photograph. 16 ref.

8517* Theory of Two-Dimensional Stretching of Rubber. **K teorii dvumernogo rastiazheniia reziny.** (Russian.) G. M. Bartenev. *Kolloidnyi Zhurnal*, v. 17, no. 1, Jan.-Feb. 1955, p. 18-23.

Original formulas are developed for the inapplicable Wall-Treloar formulas for large deformations. Graphs. 6 ref.

8518* Influence of Intermolecular Interaction on the Swelling Kinetics of Rubbers. **Vliianie mezhmolekuliarnogo vzaimodeistviia na kinetiku nabukhaniia kauchukov.** (Russian.) V. E. Gul' and A. G. Shvarts. *Kolloidnyi Zhurnal*, v. 17, no. 1, Jan.-Feb. 1955, p. 24-30.

Swelling of natural and synthetic rubbers in ethylmethyl ketone, and in ethyl and methyl alcohols at various temperatures. Graphs, tables. 13 ref.

8519* Structure of Gels. **Stroenie studnei. VII.** Globulization of Rubbers by the Halogenation of Dilute Solutions. **Globulizatsiia kauchukov posredstvom galoidirovaniia razbavlennykh rastvorov.** (Russian.) P. I. Zubov, Z. N. Zhurkina, and V. A. Kargin. *Kolloidnyi Zhurnal*, v. 17, no. 1, Jan.-Feb. 1955, p. 31-33 + 1 plate.

Contrast of viscosity of natural and synthetic rubbers solutions in dichlorethane or chloroform, when iodine is introduced. Application of electron-microscope. Graphs, diagrams, micrograph. 1 ref.

8520* Vulcanization of Divinylacrylonitrile Rubber Without Sulfur. **Vulkanizatsiia divinilakrilonitril'nogo kauchuka bez sery.** (Russian.) N. D. Zakharov, I. M. Zakharova, and S. A. Pavlov. *Legkaia Promyshlennost'*, v. 15, no. 2, Feb. 1955, p. 26-29.

Effect of vulcanization time and temperature on tensile strength, elongation, and hardness. Graphs, tables. 7 ref.

8521 New Developments in Synthetic Elastomers. R. T. Woodhams and P. F. Bruins. *Petroleum Engineer (Management Ed.)*, v. 27, Mar. 1955, p. 54C, 56C, 58C, 60C.

Discusses the developmental stage and future of four new types of elastomers. Structural formulas. 49 ref.

8522* The Ternary Rubber-Filler-Plasticizer System. **Über das Dreistoffsystem Kautschuk-Füllstoff-Weichmacher.** (German.) A. Springer. *Plaste und Kautschuk*, v. 2, no. 2, Feb. 1955, p. 40-44.

Examination of research methods on the modification of the properties of rubber mixtures; effect of different proportions of activated C and plasticizers on the properties of Buna rubber. Tables, graphs. 14 ref.

8523 Artificial Weathering of Rubber. Dale J. Milnes. *Rubber Age*, v. 76, Mar. 1955, p. 875-878.

Role of ozone is considered; apparatus for controlled ozone test exposure is explained. Diagram, photographs. 11 ref.

8524 Compounding Silicone Rubber. P. C. Servais. *Rubber Age*, v. 76, Mar. 1955, p. 879-881.

Details of silicone blending. Photographs.

8525 Engineering Developments of Rubber. July, 1953-August, 1954. Lillian Sutter and Leora E. Straka. *Rubber Age*, v. 76, Mar. 1955, p. 885-892.

A review. 121 ref.

See also:

7683 (isoprene dimers)
8481 (polymers)
8482 (polymer problems)
8503 (synthetic rubber preparation)

SPACE HEATING AND CONDITIONING

8526 Air Conditioning for Multi-Story Buildings. P. B. Gordon. *American Society of Mechanical Engineers, Paper No.* 54–A-265, 1954, 12 p. (TJ1 Am35p)

Pertinent problems influencing application and installation.

8527* Solar Heating Temperature Limit of the Floor. **Chauffage par rayonnement température limite du sol.** (French.) A. Missenard. *Chaleur & Industrie*, v. 36, no. 355, Feb. 1955, p. 37-53.

Physiological reactions of the human body, particularly the feet, to solar heating. Temperature limit of the floor as a function of the temperature of the air. Diagrams, graphs, photographs. 8 ref.

8528 Weather Data Analysis for Cooling System Design. G. V. Parmelee, G. E. Sullivan, and A. N. Cerny. *Heating, Piping & Air Conditioning*, v. 27, Apr. 1955, p. 135-140.

Method is suggested as a basis on which engineers can select *design days*. Tables, graphs. 12 ref.

8529 Proceedings of the First Annual Heating and Air Conditioning Conference. William P. Barnes. *University of Utah, Engineering Experiment Station, Bulletin No.* 69, v. 46, no. 9, Nov. 1954, 56 p. (QE169 Ut1.82b)

Six papers on automatic controls, heat pumps, and year-round air conditioning. Photograph, tables, diagrams, graphs.

TEXTILES AND FIBERS

8530* **From the Cornfield to the "Haut Couture".** J. Samuel Gillespie, Jr. *Chemurgic Digest*, v. 14, Mar. 1955, p. 8, 18-19.

Properties and production of Vicara fiber from corn protein. Photographs, table.

8531* **You Can Expect Big Future Gains for Man-Made Fibers.** Robert C. Shook. *Modern Textiles Magazine*, v. 36, Apr. 1955, p. 39-40, 54.

Indicated market developments over the next ten years.

8532* **The Tension Analyzer.** Robert D. Heffelfinger. *Modern Textiles Magazine*, v. 36, Apr. 1955, p. 59, 62, 100, 116.

A sample, recording device. Photographs, graphs.

8533* **How to Dye Acrilan Sweaters.** *Modern Textiles Magazine*, v. 36, Apr. 1955, p. 68, 70, 114.

Specific data by the Chemstrand Corp.

See also:

7578 (cloth and yarn analysis)

WELDING AND JOINING

8534* **Adhesives for Metal Aircraft Structures.** K. S. Meakin. *Adhesives & Resins*, v. 3, Jan. 1955, p. 4-7.

Examples of successful application of Redux bonding method. Tables.

8535 **Weld Metal Dilution Effects in the Metal-Arc Welding of Al-Mg-Si Alloys.** W. I. Pumphrey. *British Welding Journal*, v. 2, Mar. 1955, p. 93-97.

Study of the extent to which filler metal is diluted by the parent metal when using electrodes based on Al-5% Si and Al-10% Si alloy core wires. Micrographs, graphs, table. 4 ref.

8536 **Spot Welding of Hardenable Steels. A Review of Information Published up to June 1954.** H. E. Dixon. *British Welding Journal*, v. 2, Mar. 1955, p. 121-133.

Effect of sheet thickness and composition; recommended welding conditions; appraisal of testing methods. Graphs, tables, diagrams. 24 ref.

8537 **A Single Cycle Timer for Small Spot Welders.** G. O. Crowther and L. H. Light. *Electronic Engineering*, v. 27, Mar. 1955, p. 111-114.

Use of timer results in improved welding quality. Welding time is reduced to as short a period as is consistent with the peak power handling capacity of the welding machine. Diagrams. 2 ref.

8538 **Preventing Weld Cracks in 1100 F Stainless Piping.** R. M. Curran and A. W. Rankin. *Heating, Piping & Air Conditioning*, v. 27, Apr. 1955, p. 116-119.

Welding procedure for type 347. Table, micrographs, graphs.

8539 **Welding Titanium Without Filler Rod Improves Joint Efficiency.** A. V. Levy and Robert Wickham. *Iron Age*, v. 175, Mar. 17, 1955, p. 99-102.

Materials and methods for inert gas-shielded W arc welding by manual methods. Photographs, tables.

8540* **Spot Welds Work Well in Titanium.** M. L. Begeman and Frank W. McBee, Jr. *Machinist (London)*, v. 99, Feb. 25, 1955, p. 329-331.

Research indicates method is particularly suited for commercially pure Ti. Graphs, photographs, tables. 16 ref.

8541* The Adhesion of Metals. **Das Kleben von Metallen.** (German.) E. Frischbier and W. Schäfer. *Plaste und Kautschuk*, v. 2, no. 2, Feb. 1955, p. 28-33.

Types and properties of metal adhesives. Photographs, diagrams, graphs. 58 ref.

8542* Flame Straightening. **Das Richten mit der Flamme.** (German.) Richard Pfeiffer. *Schweisstechnik*, v. 8, no. 12, Dec. 1954, p. 133-141.

Economic considerations; applications. Photographs. 4 ref.

8543* Silox Brazing Process for Cast Iron. **Das Silox-Lötverfahren für Gusseisen.** (German.) Benno Sixt. *Schweisstechnik*, v. 9, no. 1, Jan. 1955, p. 1-5.

Process of joining cast iron with specially developed brass rods and fluxes. Diagrams, photographs, graph.

8544* Investigation of the Metallurgy and Technology of Thermite Welding of Steel 30L. **Issledovanie metallurgii i tekhnologii protsessa termitnoi svarki stali 30L.** (Russian.) M. M. Timofeev. *Svarochnoe Proizvodstvo*, 1955, no. 1, Jan., p. 5-8.

Micro-structure and mechanical properties of welded cast steel as a function of the Al-O ratio in the thermite. Photographs, micrographs, graphs, diagram, table. 4 ref.

8545* Automatic and Semiautomatic Welding of Cast Steel Under the Protection of Carbon Dioxide Atmosphere. **Avtomaticheskaia i poluavtomaticheskaia svarka litoi stali pod zashchitoi uglekislogo gaza.** (Russian.) V. N. Suslov. *Svarochnoe Proizvodstvo*, 1955, no. 1, Jan., p. 14-17.

Repair of casting defects; properties of weld metal; control of cracking after welding. Graphs, tables, photographs. 2 ref.

8546* Semiautomatic Equipment PEGSh-1 for Welding Defects in Steel Castings by a Melting Electrode in the Protective Atmosphere of Carbon Dioxide. **Poluavtomat PEGSh-1 dlia zavarki defektov stal'nogo lit'ia plaviashchimsia elektrodom pod zashchitoi uglekislogo gaza.** (Russian.) L. V. Golub. *Svarochnoe Proizvodstvo*, 1955, no. 1, Jan., p. 17-19.

Description of apparatus, its operation, and results in practice. Photograph, table, circuit diagram, diagram.

8547* Investigation of the Process of Melting Metal During Arc Welding Using Thick Coated Electrodes With High Currents. **Issledovanie protsessa rasplavleniia metalla pri dugovoi svarke tolstopokrytymi elektrodami na forsirovannykh rezhimakh.** (Russian.) A. A. Erokhin. *Svarochnoe Proizvodstvo*, 1955, no. 2, Feb., p. 1-3.

Compares operation under normal conditions and under conditions where rate of welding is up to 60 cm. per min. with a current of 300 amp. Diagrams, graphs. 4 ref.

8548* Melting of Electrode Wire During Automatic Argon-Arc Welding. **Plavlenie elektrodnoi provoloki pri avtomaticheskoi argono-dugovoi svarke.** (Russian.) A. V. Petrov. *Svarochnoe Proizvodstvo*, 1955, no. 2, Feb., p. 4-7.

Relations between applied current, size of electrode, and physical properties of the wire on melting. Diagrams, graphs. 3 ref.

8549* Stability of the Micro-Structure and Properties of Butt Joints of Austenitic Steel With Pearlitic Steel. **O stabil'nosti struktury i svoistv stykovykh soedinenii austenitnoi stali s perlitnoi.** (Russian.) A. S. Gel'man and V. S. Popov. *Svarochnoe Proizvodstvo*, 1955, no. 2, Feb., p. 7-10.

Influence of composition and heat treatment of 26 austenitic and pearlitic high-alloy steels to determine optimum conditions for joining. Tables, diagrams, micrographs.

8550 **Adhesive Bonding Properties of Various Metals as Affected by Chemical and Anodizing Treatments of the Surfaces. I. Additional Tests on Anodized Aluminum and on Zinc-Chromate-Primed Magnesium.** H. W. Eickner. *U. S. Department of Agriculture, Forest Products Laboratory, Report No.* 1842-A, Feb. 1955, 9 p. (TS800 Un3.3r)

Good joints were obtained on surfaces which were not seal treated. Tables.

8551 **How to Weld Pot Metal.** Harry Kerwin and Keith Kerwin. *Welding Engineer*, v. 40, Apr. 1955, p. 25-27.

Flame welding procedures. Photographs.

8552 **Low-Heat Method of Welding Cast Iron.** Arthur L. Phillips. *Welding Engineer*, v. 40, Apr. 1955, p. 30-33.

Torch and arc welding methods. Photographs.

8553 **Fusion Welding Titanium Without Filler Metal.** Alan V. Levy and Robert Wickham. *Welding Engineer*, v. 40, Apr. 1955, p. 38-41.

Gas-shielded arc welding equipment and methods. Photographs, tables.

Welding and Joining

8554 Welding Type 347 Stainless Steel for 1100° F Turbine Operation. R. M. Curran and A. W. Rankin. *Welding Journal*, v. 34, Mar. 1955, p. 205-213.

Special electrode composition and postweld heat treatment employed to produce welds insensitive to sigmaphase embrittlement at service temperatures. Photographs, graphs, micrographs, tables. 10 ref.

8555 Automatic Percussion Welding of Telephone Relay Contacts. A. L. Quinlan. *Welding Journal*, v. 34, Mar. 1955, p. 237-240.

Technique proves successful, in this application, with accuracy of location and good weld strength being obtained. Method is useful for high-speed automatic welding, and metals of high thermal and electrical conductivity join readily. Photographs, graph, micrograph.

8556 Selection of D-C Arc Welding Power Sources. A. U. Welch. *Welding Journal*, v. 34, Mar. 1955, p. 241-245.

Some of the lesser known factors involved in choice of rectifiers versus motor-generators d.c. arc welders are presented. Oscillograms, photograph.

8557 Seam Welding Low-Carbon Steel. M. L. Begeman and Gene C. Walker. *Welding Journal*, v. 34, Mar. 1955, p. 123S-131S.

Development of basic procedure data for the fabrication of pressure tight lap seam-welded joints in low-carbon steel sheets. Tables, photographs, micrographs, graphs, radiographs.

8558 The Flash Welding of Commercial Molybdenum. I. Temperature Distribution During Parabolic Flashing of ½-In. Sintered-and-Wrought Molybdenum Rods. Ernest F. Nippes and Wen H. Chang. *Welding Journal*, v. 34, Mar. 1955, p. 132S-140S.

Experimental results are compared with and substantiated by the findings of a microscopic examination. Micrographs, photograph, diagram, tables, graphs. 11 ref.

8559 Significance of Recent Resistance Welding Research. II. J. E. Roberts. *Welding and Metal Fabrication*, v. 23, Mar. 1955, p. 97-102.

Resistance bolt welding; spot welding Al alloys; properties of Al alloy welds. Tables, diagrams, graphs, photographs. 19 ref.

8560 Brazing Titanium to Titanium and to Mild and Stainless Steels. W. J. Lewis, P. S. Rieppel, and C. B. Voldrich. *Wright Air Development Center Materials Laboratory WADC Technical Report* 52-313, pt. 1, Nov. 1952, 34 p. *U. S. Department of Commerce, Office of Technical Services*, PB111244. (TL507 Un3.18w)

Procedures and alloys suitable for brazing Ti were investigated. The most satisfactory alloys for furnace brazing were Ag and Ag base alloys. Good joints were also made by torch brazing. Photographs, tables, micrographs, diagram.

See also:

7783 (spray welding)
7937 (welding costs)
8270 (fatigue of spot welds)
8272 (welding defects in steel)

WOOD AND FOREST PRODUCTS

8561* The Influence of Psychrometric Conditions on Some Physical Properties of Wood and Composite Wood. D. Narayanamurti and R. P. Mathur. *Applied Scientific Research*, v. 5, sec. A, nos. 2-3, 1955, p. 81-107.

Experimental data for use in design of wooden structures. Tables, diagrams, graphs. 24 ref.

8562* The Bromine Allwörden Reaction. (English.) R. D. B. Fraser and G. E. Rogers. *Biochimica et Biophysica Acta*, v. 16, no. 3, Mar. 1955, p. 307-316.

The nature of the membranes defining the bubbles is studied using the gold shadowing technique in optical microscopy. Micrographs, diagram. 17 ref.

8563 *British Paper and Board Makers' Association, Proceedings of the Technical Section*, v. 35, pt. 3, Dec. 1954, p. 355-609. (TS1080 P19p)

Nine papers on papermaking and pulp evaluation problems.

8564* Use of Deciduous and Mixed Wood Pulp in the Production of Sulfate Pulp. **Ispol'zovanie listvennoi i smeshannoi drovianoi drevesiny v proizvodstve sul'fatnoi tselliulozy.** (Russian.) G. S. Kosaia. *Bumazhnaia Promyshlennost'*, v. 29, no. 6, June 1954, p. 5-10 + 1 plate.

Tree species used; degree of digestion; viscosity and mechanical properties of cellulose. Tables, micrographs, graphs. 2 ref.

8565* Industrial Purification of Sulfate Turpentine. **Proizvodstvennaia ochistka sul'fatnogo skipidara.** (Russian.) I. I. Efishev, A. V. Prokhorov, and A. P. Matiushkina. *Bumazhnaia Promyshlennost'*, v. 29, no. 6, June 1954, p. 23-25.

Economic method for producing a low-sulfide sulfate turpentine, as a by-product in pulping plants, without the addition of new equipment or modification of the chemical process. Diagrams, tables.

8566* True Structure of Dry and Wet Cellulose. **Structure réelle de la cellulose sèche et mouillée.** (French.) Paulette Antzenberger, Gérard Fournet, and Jean Rogué. *Comptes rendus*, v. 240, no. 8, Feb. 21, 1955, p. 885-887.

Electron densities studied by X-ray diffraction patterns and structural molds. Graph. 4 ref.

8567 Reactions at Wet-Dry Interfaces on Fibrous Materials. Robert Schaffer, Wm. D. Appel, and Florence H. Forziati. *Journal of Research, National Bureau of Standards*, v. 54, Feb. 1955, p. 103-106.

Examination of the "brown-line" reaction on cellulosic materials at the boundary between wet and dry areas. Diagrams, table. 4 ref.

8568 The Technology of Paper Coating. I. *Paint, Oil & Chemical Review*, v. 118, Apr. 7, 1955, p. 12-16, 52-54.

Properties of coated papers; methods of applying coatings. (To be continued.)

8569* The Determination and Verification of Unbleached Sulphite Yield. A. B. Gorham. *Pulp and Paper Magazine of Canada*, v. 56, Convention Number, 1955, p. 159-162.

Prevention of errors in calculating pulp yields. Tables, graph. 2 ref.

8570* Determination of Penetration Rate of Liquid Media Into Wood Using a Quartz Spiral Balance. I. Water and an Air-Dry Spruce Chip. N. I. Paranyi and W. Rabinovitch. *Pulp and Paper Magazine of Canada*, v. 56, Convention Number, 1955, p. 163-170.

Includes diagrams, graphs, tables. 10 ref.

8571* Establishing a Kraft Mill Sodium Balance. R. G. Shirriff and J. R. Rowley. *Pulp and Paper Magazine of Canada*, v. 56, Convention Number, 1955, p. 190-195, 203.

Ways of reducing salt-cake losses. Diagrams, circuit diagram, table, photographs.

8572* Economics of Handling Process Chemicals. H. A. Stoess, Jr. *Pulp and Paper Magazine of Canada*, v. 56, Convention Number, 1955, p. 204-207, 215.

Methods and costs of handling chemicals in pulping operations. Graph, tables.

8573* The Heterogeneous Degradation of Cellulose. V. Improvement in the Quality of Viscose Pulps by Hydrolysis. VI. Cellulose Degradation in the Viscose Process. Theodor N. Kleinert. *Pulp and Paper Magazine of Canada*, v. 56, Convention Number, 1955, p. 208-215.

Includes tables, graphs. 41 ref.

8574* The Effect of Some Machine Characteristics on Paper Uniformity. J. Mardon, G. Gavelin, and K. C. Logan. *Pulp and Paper Magazine of Canada*, v. 56, Convention Number, 1955, p. 275-297.

Causes of variations in weight, moisture, caliper, and firmness. Diagrams, tables, photographs, graphs. 20 ref.

8575 Production of High Alpha-Cellulose Wood Pulps and Their Properties. George A. Richter. *Tappi*, v. 38, Mar. 1955, p. 129-150.

Includes tables, graphs, diagram.

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